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BETTER FRUIT

VOLUME VIII

JANUARY, 1914

Number 7

ANNUAL SPRAYING EDITION AND NATIONAL APPLE SHOW SPECIAL



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SPRAYING AN OREGON ORCHARD

Following issues of "Better Fruit" will contain articles about spraying for the different diseases and pests and in advance of the proper time for application

BETTER FRUIT PUBLISHING COMPANY, PUBLISHERS, HOOD RIVER, OREGON

THE WORLD

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A CARD TO THE TRADE

In line with our policy of procuring for our clients the very best and fanciest products of the Fruit Gardens of the Northwest, especially in the States of Oregon and Washington, we take pleasure in advising our customers and the trade in general that we have acquired on a strict F. O. B. PURCHASE BASIS for distribution in the Metropolitan District many hundreds of carloads of the very best and finest grades of both

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marketing about 95 per cent of the output of that celebrated valley.

The Wenatchee Valley Fruit Growers' Association

handling probably a larger tonnage than any other Association in the Northwest.

The Wenatchee Produce Company

whose "Rose Brand" pack is so well and favorably known throughout the world.

The Yakima County Horticultural Union

of North Yakima, an Association of growers

in the Yakima Valley, whose Blue and Red Ribbon brands stand second to none.

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We have also made heavy purchases from the

North Pacific Fruit Distributors

an Association of Northwest growers, who, although starting in business only this season, control about 80 local bodies, whose output will be marketed through them.

The Northwestern Fruit Exchange

from whom we have purchased a large block of the CASHMERE FRUIT GROWERS' UNION output, producing a quality of fruit which certainly needs no commendations from us both as to quality and pack.

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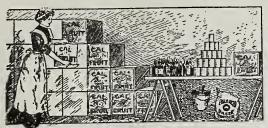
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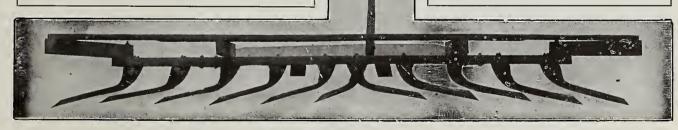
The first thing in the spring, as soon as the ground is dry enough, it should be well plowed or disced both ways, or diagonal if the trees are planted in that manner.

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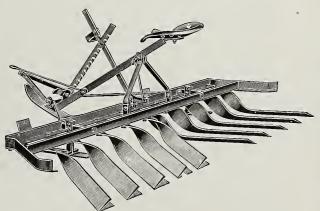
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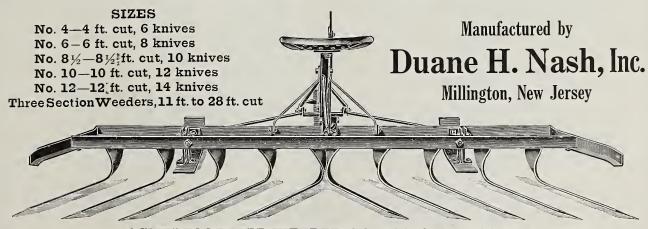
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THE ONLY WEEDER where knives always stay in place; frame holes do not wear as in wood frame machines. Insist on having only the



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Where One Grew Before
If You Have to
Feed the Odd Apple
to the Hogs?



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Take, for instance, James H. Collins' story in one of our December issues telling how the apple grower can develop a fancy trade with good profit. Mr. Collins doesn't merely say it can be done; he tells you how to do it. He writes your advertising literature for you—and it's pulling copy, too. The five cents spent for this one issue may mean the difference between a deficit and a profit.

Tree Crops are to be the Next Big Thing in Agriculture

"We are just waking up to it," says J. RUSSELL SMITH in an important series of articles on pecan growing.

He understands this subject better than anyone we know. He studied the nut orchards of this country, and some friends of the University of Pennsylvania thought so highly of his work that they sent him on an 18,000-mile trip through Southern Europe and North Africa, where pecans, chestnuts, walnuts, olives, dates and the rest have flourished for centuries. He returned with a new faith in tree crops. He tells in this series of articles how the nut industry must be reëstablished in America.

Does Your Orchard Fit Your Farm? Misfit farming can't pay out. The several parts—orchard, crops and livestock—must work together smoothly, oiled by good management. This is the idea in a series of articles, Old Farms Made New, actual instances of farms replanned on a systematic basis by the agents of the United States Department of Agriculture. They are not experiments, but have paid out. They were changed from misfits to successes.

Other Features That Will Help You

Progressive Agriculture: Boiled-down items on what the Government is doing for farmers.

Everyman's Garden: The timely methods that will make things grow in any garden, big or little.

Everyday Farm Practice: The things that the stockman, the fruit-grower and the general farmer need to know at the time they need it. Commercial Poultry Keeping: The essentials of egg and fowl farming to turn a profit.

The Countrywoman's Questions: Styles of the day, recipes and cooking helps, household shortcuts, care of the children and ideas for social work.

And other things in season.

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BETTER FRUIT

AN ILLUSTRATED MAGAZINE PUBLISHED MONTHLY IN THE INTEREST OF MODERN, PROGRESSIVE FRUIT GROWING AND MARKETING

Sprays and Spraying

Prepared by Professor A. B. Cordley in 1912, and revised by Professor H. S. Jackson and Professor H. F. Wilcox for the Twelfth Biennial Report of the State Board of Horticulture, 1913

T NOWLEDGE of a multiplicity of sprays is not essential to success in spraying. Equipped with an understanding of the range of usefulness of three or four standard sprays, with a good spray pump and with a determination to do thorough work, one is as well fortified as may be against most orchard pests. Therefore this article will be brief. In practically all of the orchard spraying done in this state but three kinds of spray are used, and probably one of these may soon be largely dispensed with. To treat of more is but to waste time and space and to lead to confusion. Most growers now understand that spraying is primarily to prevent loss from insects and from fungous diseases, and that a spray which is effective against one pest may be totally ineffective against another. Still, for the benefit of the novice, it may be necessary to emphasize the fact that there is no cure-all. Poisons like arsenate of lead or paris green are used to destroy codling moth and other insects which actually swallow plant tissues-usually caterpillars and beetles, which feed upon leaves. They have little or no value as fungicides and are not effective against San Jose scale, plant lice and other sucking insects. Bordeaux mixture is used to prevent attacks of fungous diseases and has but little value as an insecticide. Lime-sulphur is both an insecticide and a fungicide. Its range of usefulness is therefore greatly increased, but it is not a cure-all. The three principal sprays in use in this state are arsenate of lead, bordeaux mixture and lime-sulphur solutions.

Arsenate of Lead

Arsenate of lead is now the chief poison used in spraying for the codling moth, although paris green is cheaper and gives approximately as good results. Many brands of commercial arsenate of lead are now to be had, and so far as our observations go all are reasonably pure. The various brands may, however, be arranged into two definite groups which may be termed the acid arsenates and the neutral or normal arsenates. While the evidence is not conclusive, it appears to be true that the acid arsenates have some tendency to injure foliage and that they cannot so well be used with the limesulphur solutions as can the neutral arsenates. While the available evidence upon the above points is not sufficient to justify one in condemning the acid arsenates, growers are advised to use neutral arsenates wherever possible. Most manufacturers advise the use of

three pounds of arsenate of lead to fifty gallons of water. The Washington Experiment Station has demonstrated that in the dry climate of Eastern Washington one pound to fifty gallons gives equally good results in controlling codling moth. We have found that two pounds are sufficient in the Willamette Valley. It is quite probable that one pound may be sufficient here, but since this has not been demonstrated we think it best to advise two pounds to fifty gallons for the more humid portions of this state.

Some growers prefer to prepare the arsenate of lead as it is used. This is but little, if any, more troublesome than

Features of this Issue

SPRAYS AND SPRAYING

STANDARDIZING THE APPLE PACK AND BOX

SIXTH NATIONAL APPLE SHOW AT SPOKANE

SPRAYING IN AUSTRALIA

FIVE YEARS' SUCCESSFUL USE OF OIL SPRAYS

THE JONATHAN FRUIT SPOT

HOW SOME PRUNING PRACTICES DEFEAT THE REAL OBJECT

to mix the prepared arsenates in water and should be somewhat cheaper. It can be readily prepared after the following formula: Arsenate of soda, 4 ounces; acetate of lead, 11 ounces, and water, 15 to 20 gallons. Dissolve the arsenate of soda in two quarts and the acetate of lead in four quarts of warm water. When dissolved add them to the required amount of water. This formula is especially valuable for spraying very delicate foliage or for use against insects which are killed only by large amounts of poison, since it can be used upon plants in much stronger solutions that the other food poisons without injury to the foliage. If it is desired to use a combined insecticide and fungicide arsenate of lead may be added to bordeaux or to limesulphur solution in the same proportion as when water is used.

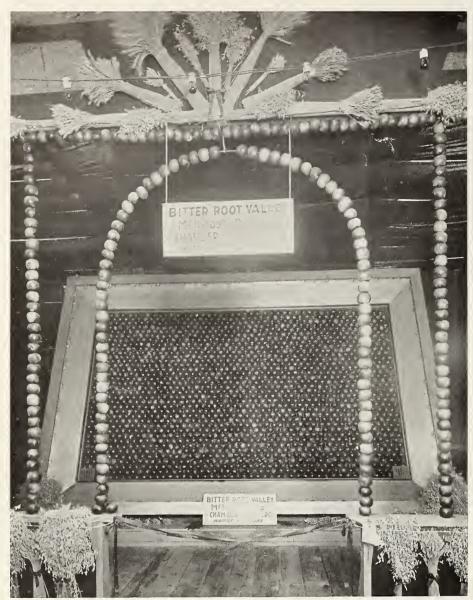
Bordeaux Mixture

Bordeaux mixture has long been the principal spray used as a preventive of fungous diseases of plants, and while other sprays, notably the lime-sulphur mixtures, give promise of largely supplanting it for certain purposes it still remains one of the most important orchard fungicides. Bordeaux for winter use may be made as follows: Copper sulphate, 6 pounds; quick lime, 6 pounds; water, 50 gallons. This is known as the 6-6-50 formula. It should be used only upon dormant trees.

When the trees are in leaf the following 4-4-50 formula is used: Copper sulphate, 4 pounds; quick lime, 4 pounds; water, 50 gallons.

A weaker formula known as the 3-6-50 is sometimes used on plants of tender foliage. In Oregon the formula has been successfully used on the peach foliage for prevention of fruit spot, but it is without doubt safer to use the self-boiled lime-sulphur: Copper sulphate, 3 pounds; quick lime, 6 pounds; water, 50 gallons.

It is of great importance that bordeaux be properly made. The mixture must be made fresh each time it is used. The ingredients may be stored in stock solution indefinitely, however. Always use wooden or earthen vessels in preparing bordeaux or the solution of bluestone. When large quantities of bordeaux mixture are required it is most convenient to have stock solutions made up, containing one pound per gallon of the respective ingredients. Take a fifty-gallon barrel of water and suspend near the top a coarse sack containing fifty pounds of crystallized or granulated commercial copper sulphate. It will dissolve in a few hours. It is convenient to arrange this the night before the spraying is to be done. In another barrel place fifty pounds of lime freshly slaked. For this purpose choose clean stone lime of the best quality. Slaking should be done carefully. Water should be added a little at a time so that slaking will take place rapidly. The process should be watched carefully and the mixture stirred constantly while the slaking is going on, adding water as needed to prevent burning, as lime should never be allowed to become dry while slaking or it will burn, nor should it become entirely submerged with water. The mixing can be conveniently done with a hoe. When thoroughly slaked make up to fifty gallons with water. If small quantities only of stock solution are needed any quantity can be made in the above mentioned proportions. If the spray is to be applied to peach trees in foliage use the 3-6-50 formula. These stock solutions can be kept for an indefinite time if water is added to



MeIntosh Reds from the Bitter Root Valley in Montana, exhibited at the National Apple Show in Spokane, November, 1913, entered by the Hamilton Chamber of Commerce and winning the first prize of \$200 for the best original and attractive display entered by an organization

replace that lost by evaporation. They should be kept covered to prevent dilution by rains. Made up in this way each gallon of stock solution represents one pound of ingredients. Each should be stirred very thoroughly before any is taken out.

In making up the mixture from these stock solutions both the copper sulphate and the lime should be diluted before being mixed. Have two dilution bar-rels or tanks. If the 6-6-50 formula be used and the spray tank holds one hundred gallons, take twelve gallons of copper sulphate stock solution and dilute to make fifty gallons in one barrel and take twelve gallons of the lime paste and dilute in the same manner in another barrel. The lime paste should be run through a fine strainer. For convenience it is well to have a platform built high enough to permit the liquids to flow from the dilution tanks into the spray cart. Allow the two diluted solutions to run together through a twenty-mesh copper wire strainer into the spray tank, mix well and apply at once.

It is always best before applying the mixture to test with potassium ferro-Buy ten cents' worth of cvanide. potassium ferrocyanide at the druggist's and dissolve in the least possible amount of water. Label the hottle poison. Take out a cupful of the wellstirred mixture and allow a drop or two of the potassium ferrocyanide to drop into it. If the drop turns yellow or brown on striking the mixture it will be necessary to add more lime. Add lime till no discoloration is seen when tested in this way. If this precaution is not taken the spray may injure the foliage. Use a good pump that gives strong constant pressure; have good nozzles that give a fine mist-like spray and eover the tree thoroughly. Always rinse the spray tank, hose and rod with water after using. Use only brass rods and connections, as bordeaux mixture will gradually attack iron. Unfortunately, even the most carefully prepared bordeaux will sometimes cause serious "russeting" of the fruit of apples. This russeting seems to be the most serious when rainy or at least humid weather prevails at the time of the first spraying after the blossoms fall, and as such conditions do usually thus prevail, at least in the Williamette Valley, "spray injury" following the use of bordeaux often becomes almost as serious as the fungus injury it was expected to prevent.

Self-Boiled Lime-Sulphur

This mixture, introduced and perfected by Scott of the Department of Agriculture, is especially desirable for use on peach foliage. The experience in most sections of the country has been that bordeaux mixture and most other fungieides are unsafe to use on peach and other tender foliage. This fact has led to the perfection of the self-boiled lime-sulphur. This mixture. prepared and recommended for use on the peach foliage, is in effect a meehanical mixture of lime and sulphur with only a very small percentage of sulphides in solution. In Oregon this spray is especially recommended for use against brown rot and fruit spot of peach. The formula recommended is as follows: Lime, 8 pounds; sulphur, 8 pounds; water, 50 gallons.

The preparation of the mixture, as described by Scott in Bureau of Plant Industry Bulletin No. 174, is as follows: "The mixture used in our experiments during the past season was composed of eight pounds of fresh stone lime and eight pounds of sulphur (either flowers or flour may be used) to fifty gallons of water. The mixture can best be prepared in rather large quantities, say enough for two hundred gallons at a time, making the formula 32 pounds of lime and 32 pounds of sulphur, to he eooked with a small quantity of water (eight or ten gallons) and then diluted to two hundred gallons. The lime should be placed in a barrel and enough water poured on to almost cover it. As soon as the lime begins to slake the sulphur should be added after first running it through a sieve to break up the lumps. The mixture should be constantly stirred and more water added as needed to form a thick paste at first and then gradually a thin paste. The lime will supply enough heat to boil the mixture several minutes. As soon as it is well slaked water should be added to cool the mixture and prevent further cooking. It is then ready to be strained into the spray tank, diluted and applied. The stage at which cold water should be poured on to stop the cooking varies with different limes. Some limes are so sluggish in slaking that it is difficult to obtain enough heat from them to cook the mixture at all, while other limes become intensely hot on slaking and care must be taken not to allow the boiling to proceed too far. If the mixture is allowed to remain hot fifteen to twenty minutes after the slaking is completed the sulphur gradually goes into solution, combining with the lime to form sulphids, which are injurious to peach foliage. It is therefore very important, especially with hot lime, to cool the mixture quickly by adding a few buckets of water as soon as the lumps of lime have slaked down. The intense heat, violent boiling and constant stirring result in a uniform mixture of finely divided sulphur and lime, with only a very small percentage of the sulphur in solution. The mixture should be strained to take out the coarse particles of lime, but the sulphur should be carefully worked through the strainer. In applying the self-boiled lime-sulphur mixture the spraying outfit should be equipped with a good agitator. The mixture settles to the bottom of the tank, and unless kept thoroughly agitated cannot be evenly applied."

Since commercial lime-sulphur has caused some burning of fruit and foliage of the apple in some sections of the Northwest, we would suggest that the self-boiled lime-sulphur be tried for the third scab spray. Either the 8-8-50 or 10-10-50 formula may be used. While not as good as the commercial limesulphur against apple scab, Scott finds that it will control mild cases of scab, and in his experiments was entirely harmless to foliage and fruit. Arsenate of lead for codling moth may be safely used with the self-boiled mixture in the same proportions as recommended when mixed with bordeaux or commercial lime-sulphur.

Lime-Sulphur Solution

It is often desirable and practicable to use sprays which combine both fungicidal and insecticidal qualities. The time, expense and annoyance of one or more sprayings may frequently be eliminated by such combinations. Thus bordeaux mixture and paris green, or arsenate of lead, has long been used as a combined spray for apple scab and codling moth, and the expense of controlling these two important apple pests has thereby been materially reduced. This spray, however, combines only the fungicidal value of bordeaux and the food-poison value of the arsenical. It is of little or no value as a contact insecticide; in other words, it is of no value against scale insects, plant lice and the numerous insects which belong to group II. During the past five years we have conclusively demonstrated that the lime-sulphur spray, which has long been known as the most satisfactory winter spray for San Jose scale, has fungicidal qualities nearly or quite equal to those of bordeaux. We have also conclusively demonstrated that it may be used in combination with arsenate of lead without materially detracting from the value of either, and that when so used it is at once an efficient contact insecticide, food poison spray and fungicide.

It has also the advantage that when properly diluted it may be used either as a winter or summer spray. As a winter spray one application of lime-sulphur spray each year will do more for the neglected orchard than can be done in any other way by the same expenditure of cash and energy. It not only destroys San Jose scale but it also apparently destroys the branch form of woolly aphis, the eggs of the green aphis, the pear-leaf blister mite, the hibernating larvae of the prune-twig



Display of North Yakima Commercial Club at the National Apple Show, Spokane, 1913, winner of the first prize of \$100 for the best display from an irrigated district entered by an organization

miner, together with some other insects which may chance to be wintering upon the trees. It is also a good fungicide. If applied in fall it is nearly or quite equal to bordeaux as a preventive of apple-tree anthracnose; applied to peach trees just before the buds open in spring it is a preventive of peach-leaf curl. As a summer spray the results of the past five seasons' work at the Oregon Experiment Station prove conclusively that when properly diluted it can be safely used upon the apple, pear, plum and prune, potato, celery and other hardy plants, and that it gives better results in controlling apple scab than does bordeaux, which has been the standard spray for this disease; and further, that it does not produce the disastrous "spray injury" to the fruit which is so common and often serious when bordeaux is used.

There are two methods of preparing the lime-sulphur spray. The formula which has been most generally used in this state is as follows: Quick lime, 50 pounds; sulphur, 50 pounds; water 150 gallons. Slake the lime thoroughly, add the sulphur and boil briskly for at least an hour or until the mixture is of a deep blood-red color with but little free sulphur on the surface. Add water to make 150 gallons. Apply with considerable force through a coarse nozzle. The "stock-solution" method which is now most generally used in

this state has been developed during the past few years. During that time there have appeared upon the market a number of concentrated lime-sulphur solutions, which have only to be diluted with water to be ready for use. Careful experiments extending over three seasons have demonstrated that these sprays are fully equal to the old homemade lime-sulphur spray in destroying San Jose scale. Whether all of them can safely be used for summer spraying is yet to be demonstrated.

The chief fault to be found with these commercial preparations is that they cost too much. The retail price is nine dollars to twelve dollars per barrel of fifty gallons. The lime and sulphur necessary to prepare fifty gallons of stock solution which is equally as efficient costs at present retail prices approximately three dollars. It may be prepared as follows: Sulphur (best finely ground) one sack, 110 pounds; lime (best grade, unslaked), 55 pounds; water, sufficient to make 60 gallons. Slake the lime, mix the sulphur into a thin paste with a little water, add it to the lime, add sufficient water to make sixty gallons, bring to a boil and boil vigorously for thirty to forty-five minutes. The sediment is then allowed to settle, after which the clear dark amber-colored liquid is drawn off and may be stored in casks for future use.



This clock was about thirty feet high, entirely covered with apples, the dial being completely covered with dried apples, making a wonderfully striking exhibit at the National Apple Show, Spokane, 1913. It took two men a week to make this exhibit. It was designed and put up by Mr. Luther, of the California Spray Company, Watsonville, California

Every grower who expects to prepare his own spray by the stock solution should provide himself with a Baume's acid scale hydrometer. Such an instrument, which should not cost over one dollar, furnishes a very simple and convenient method of testing the strength of the solution. A "stock" solution prepared as above described should test approximately thirty degrees upon such a scale. If the grower be provided with a hydrometer it is not at all necessary to obtain stock solutions of uniform strength. The following table gives the proper dilutions to be used with stock solutions of various degrees of density, both for winter and summer spraying:

summer spraying:		
	Dilution	Dilution
Stock Solution	Winter	Summer
Beaume Scale	Strength	Strength
32 degrees	. 1–12	1-32
31 degrees		1-31
30 degrees	. 1–10	1-30
29 degrees	. 1-91/2	1-29
28 degrees		1-28
27 degrees	. 1-81/2	1-27
26 degrees	. 1–8	1-26
25 degrees	$1-7\frac{1}{2}$	1-25
24 degrees	. 1–7	1-24
23 degrees	. 1-61/2	1-23
22 degrees	. 1–6	1-22

Kerosene Emulsion

Kerosene oil, or coal oil, is a powerful insecticide. The undiluted oil is, however, liable to seriously injure plants to which it is applied. This difficulty is overcome by using one of the special spray pumps which have been devised for the purpose of mixing the oil with water in any desired proportion, or by forming an emulsion with some substance that may be readily diluted with water. Soap is most commonly used for this purpose, as follows: Kerosene oil, 2 gallons; hard soap (preferably whale oil), ½ pound; water, 1 gallon. Dissolve the

soap in the water by boiling. Add the suds, boiling hot, to the oil. Churn the mixture voilently with a spray pump until it becomes a thick, creamy mass. If perfectly emulsified the oil will not rise to the surface even after standing an indefinite time. Such an emulsion may be used immediately or may be kept as a stock mixture. Before using dilute one part of the stock emulsion with ten to fifteen of water. This will be found to be an efficient remedy for green aphis, woolly aphis, red spider, mealy bugs and certain scale insects.

Crude Oil Emulsion

The crude oil emulsion spray is being used to some extent throughout the country for the San Jose and other scales, and directions for making are

here included: Fish-oil soap, 5 pounds; lye, 1 pound; crude oil, 6 gallons; water, 43 gallons. This formula will make about fifty gallons of spray. Dissolve the soap in about ten gallons of hot water, pour into a barrel or tank and add the rest of the forty-three gallons of water, add the lye and pour the oil in slowly, agitating the liquid at the same time. Never add more water after the oil has been poured into the mixing vessel. Crude petroleum cannot at this time be sold under a strict guarantee as to specific gravity, but for this purpose should test from fifteen to twenty degrees Baume.

Whale-Oil Soap and Quassia

Strong soap suds made from any good soap are useful for destroying softbodied insects like plant lice. usual, however, to employ for this purpose special soaps made with fish oils and sold as whale-oil soaps. These vary considerably in composition, some being made with soda, others with potash lye. The latter are much superior and buyers should insist on having potash soaps. For scale insects whale-oil soap is sometimes used in as concentrated a solution as two pounds of soap to one gallon of water, but only upon dormant plants. As a remedy for the various plant lice one pound of soap to eight or ten gallous of water is usually sufficient. Hop growers are inclined to believe that better results are obtained, when spraying for hop lice, by adding some quassia decoction to the soap solution, as follows: Whale-oil soap, 10 pounds; quassia, 5 pounds; water 100 gallons. Place the quassia chips in a sack, cover with eight or ten gallons of water and soak twelve to twenty-four hours. Then bring to a boil, remove the chips, add the soap and boil until it is dissolved. Add water to make one hundred gallons. The whale-oil soap and quassia spray is used principally by hop growers.

Black Leaf 40

Black Leaf 40, a proprietary tobacco preparation, may be used for the same purpose as kerosene emulsion or whale-



Glimpse of the Racks Containing the 25, 10 and 5-box Exhibits at the National Apple Show in Spokane, 1913

oil soap and quassia, and has the advantage that it does not injure foliage and is ready for use. One gallon diluted with 800 to 1,000 gallons of water makes a very efficient aphidicide.

When to Spray

General directions as to how many times to spray and when the applications should be made are at best unsatisfactory. The answer to both questions depends not only upon the variety of fruit to be sprayed, but also upon the conditions prevailing in the orchard to be sprayed and the relative importance of the orchard crop to other crops. The orchardist can afford to do more spraying than can the farmer. An almost universal practice in this state-and a good one—is to spray the orchard, whatever the kind of fruit, with limesulphur at some time while the trees are dormant. While this application is made primarily for San Jose scale, I believe there is no other which has such a generally beneficial result. It is the annual "house cleaning" of the orchards. The best time for this winter spraying is immediately after the leaves drop in fall—even before they are all off—or just before the buds open in spring. Personally, I prefer the latter, but attention should be called to the danger of unfavorable weather conditions at that time and to the consequent inadvisability of delaying the work too long. All other sprayings are for special purposes and can best be considered in connection with particular pests.

In Diseases Affecting the Apple

Apple Scab.—Spray with bordcaux or with limc-sulphur (1-30), first, when the blossoms are beginning to unfold; second, spray with lime-sulphur (1-32) immediately after the blossoms fall; third, repeat ten days or two weeks later. If prolonged rainy weather follows the third spraying a fourth two weeks later may be profitable.



District Display entered by Cashmere, Washington, at the National Apple Show, November, 1913, Spokane, Washington

Codling Moth.—Add arsenate of lead or paris green to the second scab spray. Endeavor at this time, by the most thorough work to fill the blossom end of every apple with the spray. If this be well done, and if the fruit be again thoroughly sprayed late in June, fairly good results may be obtained without further applications. It is our experience, however, that in the Willamette Valley at least, it usually pays to spray once or twice for the second brood. The first of these applications should. be about August 1, the second some three or four weeks later. While thorough work should be done at all times particular emphasis should be placed upon the first two sprayings. If all of the first-brood larvae could be killed there would be none of the second.

San Jose Scale.—Spray in winter with lime-sulphur, either immediately after the leaves fall or before the buds start in the spring. Do thorough work. Soak every part of the tree.

Aphids or Plant Lice.—To destroy stcm-mothers in the spring spray just as the buds are opening with limesulphur (1-10) plus Black Leaf-40 (1-900), or Black Leaf-40 (1-900), or kcrosene emulsion fifteen per cent solution, or whale-oil soap two pounds to four gallons of water, if none of the other sprays can be secured. This applies to all fruit trees and bush fruits. To destroy the lice after the foliage is out spray with Black Leaf-40 (1-900) plus one pound of soap to each one hundred gallons of spray, or kerosene emulsion fifteen per cent solution, or whale-oil soap two pounds to four gallons of water.

Apple Tingis.—Practice clean culture, clean up and burn all rubbish about the orchard. Spray when eggs are hatching in late May or early June with kerosene emulsion or Black Leaf-40.

Apple-Tree Anthracnose.—In orchards where slightly affected with anthracnose or where it is considered advisable to spray as a matter of general practice, it is advised to spray once in the fall, as soon as possible after the fruit is picked, using bordeaux mixture 6-6-50. In orchards where the disease is on the increase and it is desired to make a special effort to prevent any further spread, growers should spray twice with bordeaux mixture (6-6-50) after the fruit is picked. The two applications should be about two or three weeks apart. Where the disease is abundant and is seriously interfering with the growth and productiveness of the orchard and it is desired to clean up the orchard in the shortest time possible, then it is advised to spray at least once before the fruit is picked with bordeaux mixture 4-4-50. This application should be made about the



Huge Map Which Explained the Scope of the North Pacific Fruit Distributors.

Nine green lights at the points where the sub-centrals are located were connected with the headquarters at Spokane by ribbons. Spokane in turn was connected by ribbons with the various
markets in all parts of the country, which were represented by red lights. Shown at National
Apple Show, Spokane, November 17-22, 1913.



District Display entered by Walla Walla, Washington, at the National Apple Show, Spokane, 1913

middle of September or before the first fall rains. In addition, such an orchard should be sprayed twice with bordeaux, using the 6-6-50 formula as recommended above.

For Use on Cherry Trees

Shot-Hole Fungus.—Spray with bordeaux or lime-sulphur when blossoms are opcning and again when petals have fallen.

Cherry Slugs.—Spray with white hellebore or arsenate of lead whenever they become troublesome.

Rosy Apple Aphis.—See under "Apple." San Jose Scale.—See under "Apple." Cherry Gummosis.—See article on this disease in the biennial report of "Crop Pest and Horticultural Investigations," issued by the Oregon Experiment Station at Corvallis. A copy will

be sent on request to the secretary. Brown Rot.—See under "Peach."

For Diseases of the Peach

Peach-Leaf Curl.—Spray thoroughly before buds open with bordeaux or lime-sulphur.

Peach Blight.—Spray with bordcaux soon after fall rains begin or immediately after late fruit is gathered.

Peach Fruit Spot.—Spray same as for blight. Also spray once or twice in late May and early June with self-boiled lime-sulphur. Do not make these applications during rainy weather.

Brown Rot.—Destroy all rotting fruit. Spray three or four weeks after the petals fall with 8-8-50 self-boiled limesulphur. Repeat three weeks later. One month before the fruit is expected to ripen make a third application, using the same mixture.

San Jose Scale.—Sce under "Apple."
In Troubles Affecting the Pear
Pcar Scab.—See under "Apple Scab."
Codling Moth.—See under "Apple."
San Jose Scale.—See under "Apple."
Pear Slug.—See under "Cherry Slug."

Fire Blight.—This is the most destructive disease of the pear; it also attacks the apple and other related trees. Extreme care and thoroughness are necessary in dealing with this dis-

ease. Fire blight can be controlled only by cutting out all diseased tissue as soon as detected and burning it. Special attention should be given to the prevention of the formation of any "holdover" cankers. If such are formed they must be removed before the trees blossom the following spring. Examine not only branches but trunk, and even roots. Sterilize tools and wounds made in cutting out the disease frequently with solution of corrosive sublimate.

Pear-Lcaf Blister Mite.—Spray with lime-sulphur just as buds are starting.

Plum and Prune Troubles

Brown Rot.—See under "Peach." Shot-Hole Fungus.—See under "Cherry."

San Jose Scalc.—Sce under "Apple."

The Indiana Apple Show was held at Indianapolis, November 5th to 11th, this year, and as usual proved a very interesting and successful show.

The trustees and managers of the North Pacific Fruit Distributors were in evidence during the Spokane Apple Show and held business sessions daily. The trustces present were Mr. W. N. Yost of Meridian, Idaho; H. N. Slagle, Garfield, Washington; H. C. Sampson, Spokane; W. M. Sackett, Hamilton, Montana; F. E. Sickles, North Yakima; Harry Hubler, Walla Walla; O. W. Roderick, Wenatchee; M. C. Richards, general attorney. Mr. H. F. Davidson, the president, was unable to be present as he is in New York for the next few months. General Manager Mr. J. H. Robbins was everywhere, looking after the interests of all. The following subcentral managers were also present: M. J. Higley, Payette, Idaho; M. F. Mitchelson, Garfield; W. O. Dow, Wenatchee; C. L. Longwell, Hamilton; H. G. Barnes, Walla Walla; E. G. C. Johnston, North Yakima; J. H. Chapman, Milton, Oregon; E. Y. Jensen, Freewater; A. T. Taggard, Waitsburg, Washington, director of Walla Walla subcentral; W. A. Wallacc, vice-president of Walla Walla subcentral.

"Health's Best Way, Eat Apples Every Day." This slogan originated with Mr. Coyne, of Coyne Bros., Chicago. It was published on the cover page of "Better Fruit" some months ago. Mr. Coyne has generously handed this slogan to the International Apple Shippers' Association for their use to assist in stimulating an increased consumption of apples.

The Pacific Coast Produce Association, composed of apple dealers and commission men, has been recently organized with Mr. W. B. Glafke of Portland, president; Mr. W. R. Bradley of Tacoma, treasurer, and Charles F. Fosch, secretary.

The fruit crop of Wenatchee Valley will probably amount to approximately \$2,500,000 this year.

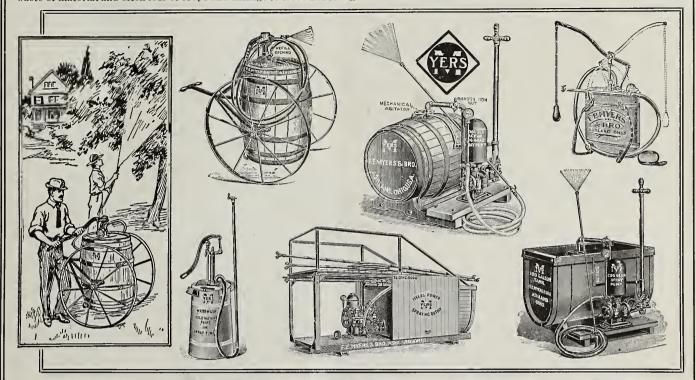


Opportunity-Vera, Washington, Display at the National Apple Show, November 17-22, 1913, held at Spokane, Washington, winning the second prize of \$50 for the best display of apples from an irrigated district entered by an organization.

MYERS SPRAY PUMPS

BUCKET, BARREL AND POWER, INSURE SUCCESSFUL SPRAYING OPERATIONS

No matter how large or small your orchard or vineyard; no matter how long you have been spraying or how much you have heard or talked about it, it will be to your advantage to investigate MYERS SPRAY PUMPS before another spraying season arrives. Spraying, to be successful, must be correctly done. Slip-shod, careless methods, with a cheap, undersized outfit, are expensive a loss of time, a waste of material and often loss of crops and damage to trees and foliage.



IT PAYS TO SPRAY MYERS WAY—With a Myers Bucket, Barrel or Power Outfit—according to your requirements. It's effective and efficient spraying and productive of results every time. Illustrations appearing above show a few styles of Myers Outfits—ready for operation. Many additional styles, with a complete line of proven Nozzles, Hose, Fittings, etc., are illustrated and described in our Catalog No. SP13—ask for a copy by return mail with name of our nearest dealer—in time to be prepared to spray "MYERS WAY" next spring.

ASHLAND PUMP AND HAY TOOL WORKS

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Standardizing the Apple Pack and Box

By E. H. Shepard, Editor of "Better Fruit"

THE public is demanding standard packages. As a result laws are being pased by the State Legislatures and Congress to proteet purehasers so they may be assured of receiving both the quality and quantity they purchase. There has been a great deal of agitation for standard packages for apples during the past few years and various bills have been introduced into Congress, among which may be mentioned the Porter bill, the Lafean bill and the Sulzer bill. Out of eonsideration for Northwestern fruitgrowers, where most of the apples are grown that are packed in boxes, the advocates of the Sulzer bill agreed to eliminate from that bill all of the section pertaining to apples packed in boxes and to pass only a bill pertaining to barrel apples, providing the North-western fruitgrowers would agree and present a bill that would standardize the apple box and the quality.

At the National Apple Show in Spokane a conference of growers was held, and among other subjects brought

up for eonsideration was "The Standardizing of the Apple Box and Paek.' I suggested that the matter be referred to a committee to be eomposed of representatives from each of the principal districts and different shipping con-eerns. The following committee was appointed: J. H. Segru, Cashmere, Washington; O. K. Conant, North Yakima, Washington; Wm. Yost, Meridian, Idaho; W. M. Sackett, Hamilton, Montana; Oris Dorman, Spokane, Washington; C. E. Whistler, Medford, Oregon; W. N. Riehards, attorney, North Yakima, Washington; E. H. Shepard, Hood River, Oregon, chairman. We spent an entire half day in preparing a bill, proeeeding by seetions. Each seetion of the bill, which I will read later, was unanimously approved by every member of the committee present, therefore it seems reasonable to assume that this bill will be satisfactory to all sections. Last year a bill was prepared by Mr. C. E. Whistler of Medford, which was submitted to the different state horticultural society meetings and accepted by

them. This bill the committee at Spokane revised, making the principal changes in sections four and seven. The bill as drawn up by the committee at Spokane met with the unanimous support of every grower present at the Spokane conference. It is intended that this bill shall be presented to Congress, and the greater the number of endorsements that can be secured from state horticultural societies, boards of horticultural and the shipping associations and concerns, the more apt we are to receive favorable consideration.

State laws, in reference to establishing a standard size of apple box, are as follows:

Oregon.—"Be it enacted by the people of the State of Oregon: Section 1. There is hereby ereated and established a standard size for apple boxes for the State of Oregon. Section 2. The standard size of an apple box shall be eighteen inches long, eleven and one-half inehes wide, ten and one-half inehes deep, inside measurement. See-

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Cor. First and Cedar Sts., CHICO, CAL.

TO DESTROY APHIS, THRIPS, ETC.

Without Injury to Foliage SPRAY WITH

"Black Leaf 40"

SULPHATE OF NICOTINE

"Black Leaf 40" is highly recommended by Experiment Stations and spraying experts throughout the entire United States.

Owing to the large dilution, neither foliage nor fruit is stained. Also, "Black Leaf 40" is perfectly soluble in water; no clogging of nozzles.

PRICES

10-pound Can \$12.50

Makes 1,500 to 2,000 gallons for Pear Thrips, with addition of three per cent distillate oil emulsion; or about 1,000 gallons for Green Aphis, Pear Psylla. Hop Louse, etc., or about 800 gallons for Black Aphis and Woolly Aphis-with addition of three or four pounds of any good laundry soap to each 100 gallons of water.

2-pound Can\$3.00 ½-pound Can

If you cannot obtain "Black Leaf 40" from a local dealer, send us P.O. Money Order, and we will ship you by express at the above prices, prepaying the expressage to your nearest railroad town in the United Stafes.

The Kentucky Tobacco Product Company

Louisville, Kentucky

tion 3. That the special size of apple boxes shall be twenty inches long, eleven inches wide and ten inches deep, inside measurement. Filed in the office of the Secretary of State, February 20, 1911.

Montana.—At a session of the Legislature held in Helena, Montana, February, 1913, a law was enacted which established a standard apple box for Montana and fixed the requirements for grades as follows: "The standard size of apple box shall be of the following dimensions when measured without distention of parts: Depth of end ten and one-half inches, width of end eleven and one-half inches, length of box eighteen inches; inside measurement, as near as possible, two thousand one hundred and seventy-three and one-half cubic inches. The box in which apples shall be packed and offered for sale that contains less than the required cubical contents must be marked 'short box' on one side and one end with letters one inch high."

Washington.—An act relating to weights and measures, establishing standards therefor; providing for the enforcement thereof; prescribing penalties for the violation of this act and repealing sections 9511 to 9523, inclusive, of Remington and Ballinger's Annotated Codes and Statutes of Washington: "Be it enacted by the Legislature of the State of Washington: There is hereby created and established a standard size for apple boxes and pear boxes for the State of Washington. The standard size of an apple box shall be eighteen inches long, eleven and one-half inches wide, ten and onehalf inches deep, inside measurement. The standard size of a pear box shall be eighteen inches long, eleven and one-half inches wide, eight inches deep, inside measurement.'

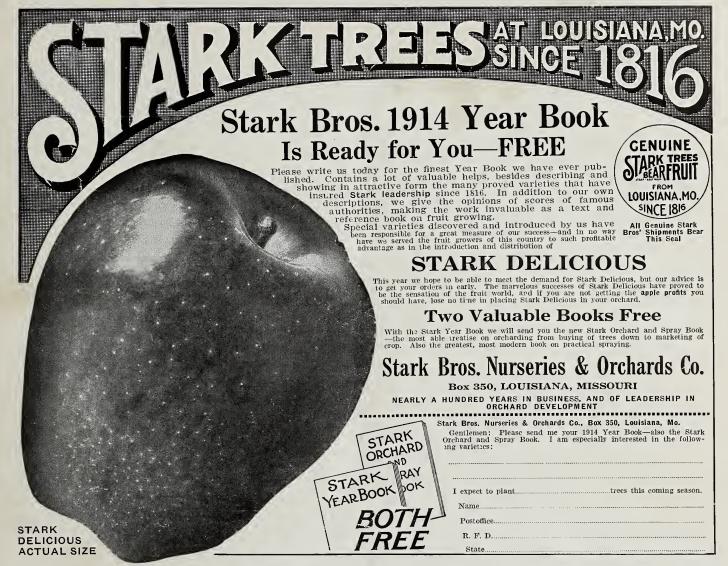
California, Colorado and Utah have not passed any law in reference to standardizing any size apple box. California is beginning to use the Oregon standard box, 101/2x111/2x18 inches inside measurement. The State of Virginia and the State of Iowa are also using this box. The only three states that I know of where this box is not generally used, where they pack apples in boxes, are the States of California, Colorado and Utah.

The following laws have been passed by the different states in reference to

the labeling of boxes:

Oregon.—"Be it enacted by the people of the State of Oregon: Section 1. Any person, firm, association or corporation engaged in growing, selling or packing green fruits of any kind within the State of Oregon shall be required, upon packing any such fruit for market, whether intended for sale within or without the State of Oregon, to stamp, mark or label plainly on the outside of every box or package of green fruit so packed, the name and postoffice address of the person, firm, association or corporation packing the same; provided further, that when the grower of such fruit be other than the packer of the same, the name and postoffice address of such grower shall also prominently appear upon such box or package as the grower of such fruit. Section 2. It shall be unlawful for any dealer, commission merchant, shipper or vendor, by means of any false representations whatever, either verbal, printed or written, to represent or pretend that any fruits mentioned in section 1 of this act were raised, produced or packed by any person or corporation or in any locality other than by the person or corporation, or in the locality where the same were in fact raised, produced or packed, as the case may be. Section 3. If any dealer, commission merchant, shipper, vendor or other person shall have in his possession any of such fruits so falsely marked or labeled contrary to the provisions of section 1 of this act, the possession of such dealer, commission merchant, shipper vendor or other person of such fruits so falsely marked or labeled shall be prima facie evidence that such dealer, commission merchant, shipper, vendor or other person has so falsely marked or labeled such fruits. Section 4. Any person violating any of the provisions in this act shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not less than five dollars nor more than five hundred dollars, or by imprisonment in the county jail not less than ten, nor more than one hundred days, or by both such fine and imprisonment, at the discretion of the court. Approved by the governor February 7, 1907. Filed in the office of the Secretary of State February 7, 1907. Montana.—The Montana bill as it was

passed at the session of the Legislature held at Helena, January and February, 1913, is as follows: "The box when packed and offered for sale shall bear



upon it in plain figures the number of apples in the box (within five apples); the name of the firm, company or organization who shall have first packed or authorized the packing of same; also the name of the locality where the fruit was grown; also the correct name of the variety of apples in the box; also the grade adopted by the grower, firm, company or organization that authorized the packing of the fruit."

Idaho.—The horticultural laws of Idaho, published by authority of the State Board of Horticultural Inspection, 1913, section 14, are as follows: "Any person or persons or corporation, his or their agents, selling or offering for sale fruit or trees of any kind, shall affix to each package a distinct mark or label showing the kind and quality of same, the name of the grower or shipper and locality where grown."

Utah.—The Utah law regarding the labeling of boxes, etc., is as follows: "Chapter 64, Session Laws 1913. An act providing for the proper branding of closed packages of apples, pears, peaches and apricots before salc and shipment thereof; and fixing a penalty for the violation of provisions thereof. Be it enacted by the Legislature of the State of Utah. Section 1. It shall be unlawful to sell, ship or dispose of or

offer to sell or dispose of, or to have in one's possession for sale or shipment of any closed package of apples, pears, peaches or apricots which is not marked in plain and legible manner with the name and address of the person, firm or corporation in possession of the fruit at the time of packing; also the name of the variety or varieties of fruit, and the designation of grade of fruit as prescribed by the State Horticultural Commission. The term 'closed package' within the meaning of this act shall refer to any box, barrel, basket or other container, the contents of which cannot be seen or inspected without opening such package. Section 2. It shall be unlawful to sell or offer for sale or have in one's possession for sale or shipment any package of fruit, whether closed or open, which is misbranded. A box, barrel, basket or package of fruit shall be deemed 'misbranded' within the mean-ing of this act when it is marked in a plain and legible manner with the name and address of any person, firm or corporation, other than that in possession of the fruit at the time of packing, with any other than the correct variety name of the fruit, or any designation of grade which does not comply with the rules and regulations of the State Horticultural Commission. Provided, that in case the correct variety name of the fruit is not known to the person, firm or corporation responsible for the packing, the variety may be marked 'unknown.' Section 3. Any person charged with the enforcement of this act may enter upon any premises to make examination of any package of fruit suspected of being falsely marked. Section 4. Any person, firm or corporation violating any of the provisions of this act shall be guilty of a misdemeanor. Approved March 18, 1913."

Washington.—The law in the State of Washington, taken from the "Laws and regulations relating to the work of the Department of Agriculture of the State of Washington," page 64, section 160, entitled "Shipments labeled," reads as follows: "Any fruit grown in the State of Washington and offered for sale or shipment in closed packages shall be marked on the outside of the box or package with the name of the variety, or if the variety is unknown shall be marked 'variety unknown,' and show the location where grown and the name of the grower or owner; and all boxes or packages of apples, pears and peaches shall be marked with the number in each package or the tiers packed; and the name of no other place or



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The Mitchell-Lewis Motor Company has the enviable record of eighty years of faithful service to the American public. Bear this in mind when you get ready to buy a car, for it operates as insurance of quality.

Eighty years of faithful service is an asset of no uncertain value. This company held the respect of the early settlers of the western country because of absolutely honest merchandise in the shape of farm wagons. It established its standing before automobiles were known. When it embarked in the automobile business, it clung to the policy that made its farm wagon business famous. And its automobiles are famous, for the same satisfying reason.

You've got something behind you when you buy. Our standing and prestige constitute a bulwark of safety. Add to this the remarkably fine character of the Mitchell Models and your purchase is as solid as the Rock of Gibrallar. Ask any farmer in America what he thinks of the old Mitchell-Lewis Wagon Company. Ask any one of thirty thousand Mitchell automobile owners what he thinks of the Mitchell-Lewis Molor Company. Their reputation and reliability are precisely the same.

The Mitchell Models for 1914:

The Mitchell Little Six—fifty horse-power—132-inch wheel base—36x4½ inch tires—two or five passenger capacity——

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locality shall appear on any box or package of such fruit, except the address of the place to which it is shipped in case of shipment. (Section 3116, R. & B.)"

I find only one state, so far as I am able to ascertain, as passing a law relative to grades, establishing certain specifications for "extra fancy," "fancy" and "C" grades. This is the State of Montana.

The Sulzer law, as taken from the published official proceedings of the ninth annual convention of the International Apple Shippers' Association meeting at Cleveland, August 6-8, 1913, is as follows: "The apple package and grade law in effect July 1, 1913. Be it enacted by the Senate and House of

Representatives of the United States of America in Congress assembled that the standard barrel for apples shall be of the following dimensions when measured without distention of its parts: Length of stave, twenty-eight and onehalf inches; diameter of head, seventeen and one-eighth inches; distance between heads, twenty-six inches; circumference of bulge, sixty-four inches outside measurement, representing as nearly as possible seven thousand and fifty-six cubic inches, provided that steel barrels containing the interior dimensions provided for in this section shall be construed as a compliance therewith. Section 2. That the standard grades for apples when packed in barrels which shall be shipped or delivered for shipment to interstate or foreign commerce, or which shall be sold or offered for sale within the District of Columbia or the territories of the United States, shall be as follows: Apples of one variety, which are wellgrown specimens, hand picked, of good color for the variety, normal shape, practically free from insect and fungous injury, bruises and other defects. except such as are necessarily caused in the operating of packing, or apples of one variety which are not more than ten percentum below the foregoing specifications, shall be 'standard grade minimum size two and one-half inches, if the minimum size of the apples is two and one-half inches in transverse diameter; 'Standard grade minimum size two and one-fourth inches,' if the minimum size of the apples is two and one-fourth inches in transverse diameter; or 'standard grade minimum size two inches,' if the minimum size of the apples is two inches in transverse diameter. Section 3. That the barrels in which apples are packed in accordance with the provisions of this act may be branded in accordance with section 2 of this act. Section 4. That all barrels packed with apples shall be deemed to be below standard if the barrel bears any statement, design or device indicating that the barrel is a standard barrel of apples, as herein defined, and the capacity of the barrel is less than the capacity prescribed by section 1 of this act, unless the barrel shall be plainly marked on end and side with the words or figures showing the fractional relation which the actual capacity of the barrel bears to the capacity prescribed by section 1 of this act. The marking required by this paragraph shall be in block letters of size not less than seventy-two point, one inch, gothic. Section 5. That barrels packed with apples shall be deemed to be misbranded within the meaning of this act: (1) If the barrel bears any statement, design or device indicating that the apples contained therein are 'standard grade' and the apples when packed do not conform to the requirements prescribed by section 2 of this act. (2) If the barrel bears any statement, design or device indicating that the apples contained therein are 'standard grade' and the barrel fails to bear also a statement of the name of the variety, the name of the locality where grown and the name of the packer or person by whose authority the apples were packed and the barrel marked. Section 6. That any person, firm or corporation or association who shall knowingly pack or cause to be packed apples in barrels, or who shall knowingly sell or offer for sale such barrels in violation of the provisions of this act, shall be liable to a penalty of one dollar and costs for each such barrel so sold or offered for sale, to be recovered at the suit of the United States in any court of the United States having jurisdiction. Section 7. That this act shall be in force and effect from and after the first day of July, nineteen hundred and thirteen."

Mr. C. E. Whistler of Medford, Oregon, prepared a bill last year which was adopted by the State Horticultural Societies of Oregon, Washington and Idaho. The committee appointed by the conference of growers at the National Apple Show held in Spokane revised this bill, making changes considered necessary in sections 4 and 7. The Spokane conference instructed Mr. Whistler to present a copy of this bill to all state horticultural society meetings, our state boards of horticulture and all the different associations and shipping firms for their endorsement. It is hoped and believed that this bill will prove satisfactory to everybody. If so, these endorsements will be quickly secured. When this is donc the bill can be presented to Congress for consideration.

The following is a copy of the bill as revised: "A bill to establish a standard box for apples and for other purposes. Be it enacted by the Senate and House



THE POPULAR WEEKLY FOR FRUIT GROWERS AND GARDENERS

THE POPULAR WEEKLY FOR FRUIT GROWERS AND GARDENERS

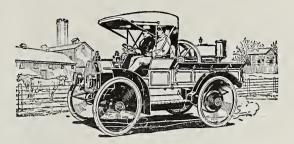
While The Country Gentleman is the oldest agricultural journal in the world, it is not yet three years of age in its present improved form. Good evidence of the wisdom of the plan to furnish the modern business farmer and fruit grower with practical, helpful information and reading matter, written from a new angle, is shown in the wonderful jumps møde in the circulation of this attractive weekly during the past two years.

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ISE International motor trucks to handle your fruit and for your light hauling and note the decrease in your hauling and delivery expense. Note also the increase in profit due to the saving in the time the fruit spends on the road. No wonder so many fruit growers are buying International motor trucks. International motor trucks cost comparatively little to buy and less than horses and wagons to keep.

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Champion Deering McCormick Milwaukee Osborne Plano

of Representatives of the United States of America in Congress assembled: Section 1. That the standard box for apples shall be of the following dimensions when measured without distention of its parts: Depth of end, ten and one-half inches; width of cnd, cleven and one-half inches; length of box, eighteen inches, all inside measurements, and representing as nearly as possible two thousand one hundred and seventy-three and one-half cubic inches. Section 2. That any box in which apples be packed and offered for sale which does contain less than the required number of cubical inches as prescribed in section 1 of this act shall be plainly marked on one side and one end with the words 'short box,' or with the words or figures showing the fractional relation which the actual capacity of the box bears to the capacity of the box prescribed in section 1 of this act. The marking required by this paragraph shall be in block letters of the size not less than seventy-two point block gothic. Section 3. Standard boxes when packed, shipped or delivered for shipment in interstate or foreign commerce, or which shall be sold

or offered for sale within the District of Columbia or the territories of the United States of America shall bear upon one or both ends in plain figures the number of apples contained in the box; also in plain letters the style of pack used, the name of the person, firm, company or organization which first packed or caused the same to be packed; the name of the locality where said apples were grown and the name of the variety of the apples contained in the box, unless the variety is not known to the packer, in which event the box shall be marked 'unknown.' A variation of three apples from the number designated as being in the box shall be allowed. Section 4. That the apples contained within the said standard box when so packed and offered for sale, shipment or delivery in interstate or foreign commerce, shall be apples of one variety, well-grown specimens, reasonably uniform in size, properly matured, practically free from dirt, in-sect pests, diseases, bruises and other defects except such as are necessarily caused in the operation of packing. Section 5. That standard boxes packed in accordance with the provisions of



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More mistakes are made in buying orchard sprays than in almost any other line of agricultural work. Always consult a specialist who knows what to recommend for each particular insect or fungus. Our entomologist, PAUL R. JONES, is at your service free. His experience with the United



States Dept. of Agriculture for many years places him in a position to give you absolutely correct advice. We handle the most complete line of Insecticides in the U. S. Among the products we manufacture and distribute are

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Describing Fruit and Ornamental Trees, Shrubs, Vines, Roses, Berry Plants, etc. Free on request. Write now, mentioning this paper.

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The oldest brand now on sale in this community. Our continuous production of a high grade pure solution has made friends for Dependable Brand wherever it has been used Prices quoted f.o.b. Salem, Portland, or delivered

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this aet may be marked 'standard.' Section 6. That boxes containing apples marked 'standard' shall be deemed to be misbranded within the meaning of this act when the size of the box does not conform to the requirements of section 1 of this aet, and when the markings on the box and the contents thereof do not eonform to the requirements of sections 3 and 4 of this act. Section 7. That any person, firm, company or organization who shall mark or cause to be marked boxes packed with apples or sell, or offer for sale, shipment or delivery in interstate or foreign commerce, apples in boxes contrary to the provisions of this aet, or in violation hereof, or shall sell or offer for sale or delivery in interstate or foreign commerce in a standard box, apples other than those originally packed therein, without first completely obliterating the original markings and labels on such box, and mark the box to eonform to the provisions of this act, shall be liable to a penalty of one dollar for each box so marked, sold or offered for sale or delivery, and eosts, to be recovered at the suit of the United States in any court having jurisdiction; provided that the penalty to be recovered on any one shipment shall not excccd the sum of one hundred dollars, exelusive of eosts. Section 8. That this act shall be in force and effect from and after the first day of, 191.."

Note-All endorsements of this bill should be mailed promptly to C. E. Whistler, Medford, Oregon.

The National Apple Show held in Spokane, November 17 to 22, 1913, was a splendid success, being superior to the shows held in 1911-12 in every way. Carload exhibits have been discontinued. It was found by experience that it is far better to have many individual exhibits, each exhibit containing from five to twenty-five boxes, than it is to have a show filled with commercial cars. The small exhibits make the show far more attractive, more fruitgrowers attend and the public is more interested. In eonnection with the apple show a conference of fruitgrowers from all sections of the Northwest was held, which proved not only interesting but very instructive, as evidenced by the rapid fire of questions and the general discussions that took place, particularly when the subject of apple seab eame up. It seems many growers have been troubled more or less with fungus this year and all are mighty anxious to know how to prevent it. The attendance at the show was probably in the neighborhood of 40,000.

The Oregon Agricultural College will hold its annual winter short course January 5th to 31st. This will be partieularly interesting to farmers in general and fruitgrowers will find the eourse very instructive, as a splendid series of leetures will be given on all the different features of oreharding as well as on pests, diseases and proper methods to be used for their control.

Why trust all your eggs to the apple basket?

Sometimes the bottom drops out. A big Eastern apple crop generally spells lean profits for the Western grower. The business orchardist of today is planting more than one crop. You can insure your profits by planting the

J. H. HALE Peach

One Acre-\$1,420

This peach is no experiment; it has been tested, tried, proved for nine years in all kinds of peach soils and climates. It is a long profit producer on the Western man's standard. It tops, it leads—it brings a leader's price.

September 14th, 748 bushels, or an average of 5½ bushels or 8 crates per tree, over 95 per cent of this fruit being high class merchantable fruit, selling f.o. b, at the farm at \$2.00 and \$2.50 per bushel,"

(Signed) J. H. HALE-inshis report on his 1913 crop.

The crowning achievement of Mr. Hale's life-work is this J. H. HALE peach. From any standard it is judged, it will prove itself a wonder variety. Briefly, these are its merits which entitle it to a prominent place in your spring planting list:

In size the J. H. HALE peach is like a small cannon-ball, ½ to ½ larger than Elberta; color a deep golden yellow, overlaid with carmine; smooth, thick skin; practically fuzzless; globular shape, excellent for canning; flesh firm and fine-grained—solid as a cling, yet perfect freestone; fruit ripens five days ahead of Elberta.

Colors up a week to 10 days before maturing, allowing extra early picking. Owing to solidity of flesh, matured specimens can be allowed to hang on trees a week or more, extending the season at both ends.

Perhaps the greatest feature of the L.H. HALE peach

Perhaps the greatest feature of the J. H. HALE peach is its shipping qualities. Specimens have been shipped from Connecticut into states as far distant as Florida, California and Texas, where they were kept 10 to 18 days after they were received.

The J. H. Hale is solid enough to pack and ship in bar-

rels. As a Western grower you must realize the tremend-ous advantage such a peach holds for you.

Our exclusive contract

You can get gennine J. H. HALE peach trees only from the William P. Stark Nurseries, Stark City, Missouri. We are sole growers and distributors. These trees are propagated directly from buds cut by Mr. Hale from fruiting trees in his

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William P. Stark's genuine "Delicious"

No other apple is such a big revenue producer as the Delicious. It has topped apple markets of the world for

We have an exclusive contract with Mr. S. L. Hiatt, the owner of the original Delicious tree, to furnish us with all the scions and buds cut directly from the original tree. You can now secure direct from the Willlam P. Stark Nurseries,

personally selected one and personally selected one and two-year old guaranteed Delicious apple trees at growers' prices. Save 30 to 50 per cent, and get best

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Prices in plain figures. Lists worth-while apple, peach. all worth-while apple, peach, pear, plum, apricot, quince, cherry trees, grape, currant, gooseberry, raspberry, blackberry, roses, shrubs and ornamentals. Write now and get advantage of direct-from-nursery prices.

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Entered as second-class matter December 27, 1906, at the Postoffice at Hood River, Oregon, under Act of Congress of March 3, 1879.

The Apple Crop of 1913.—Nearly every apple-producing section of the Northwest is practically sold out and the quantity remaining unshipped on the 15th of December was considerably less than twenty-five per cent of the total crop. Even a large part of that which is being held in cold storage has already been contracted for and sold, and is simply being held for future delivery as desired. All reports of sales made so far during the year 1913 have been gratifying and satisfactory to the fruitgrowers. Comparatively few pools have been closed and therefore few net figures on any varieties are obtainable at the present time. The ones that have been closed are the earlier varieties like Gravensteins and some of the early fall apples, of which the quantity is not very large, and therefore the returns are not very significant. "Better Fruit" decided this year not to publish individual sales of single carloads or contract prices for small quantities. Such items are usually published in the local newspapers, big dailies and weeklies. It is the intention of "Better Fruit" to publish later on some interesting information about the net prices for different varieties and different grades from each of the different districts when the pools are closed and the actual figures known which the grower will receive. A few sales at high figures in the early part of the season may be offset by a declining market, while on the other hand the market may start in at a low figure and the tail-end of the season bring up the average price, so that the information of greatest value is the net average when the season is closed. Such information we will give as early as available, and we trust will prove interesting. We know it will be gratifying to the fruitgrowers when compared with last year's prices, as nearly all of the marketing concerns are reported as having sold their output at very satisfactory figures.

The Oregon State Horticultural Society Meeting.—The State of Oregon held it twenty-eighth annual session of the State Horticural Society in Portland, December 10th to 12th. During the past two years the attendance has been much smaller than previously, and it was with pleasure that we noted the increased attendance this year and the renewed interest in the fruit industry. as evidenced by the attendance and the interest displayed on the part of every fruitgrower present. The idea has prevailed among members of the society for several years past that a larger attendance could be secured by having the meeting held in the center of the different fruit-growing sections of the state. The meeting this year decided to try out this plan and unanimously passed a resolution to hold its next annual meeting in Medford in 1914. Medford made a strong appeal for the meeting, presenting a strong invitation from the Commercial Club and other representative bodies and sixty prominent fruitgrowers, all embodied in the form of a petition promising, in addition, to entertain the society more royally than it had been entertained in the past years. If the plan of holding the meeting in Southern Oregon is a success in 1914 undoubtedly the society will hold its annual meetings in other sections of the state in the future years. Mr. C. E. Whistler presented the application for the next annual meeting to be held in Medford and he was unanimously elected president of the society for the year 1914. Mr. F. W. Powers was re-elected secretary.

The Sixth National Apple Show was held at Spokane, November 17th to 22d, 1913. The show was a splendid success with an attendance of approximately 40,000, and was a decided improvement over the shows held during the past two years. The new plan of confining the exhibits to feature displays, omitting the carloads and giving prizes for one, five, ten and twentyfive-box displays, makes the show more interesting to the public and brings a far greater number of exhibitors than the previous plan of giving big prizes on carloads. The feature displays were particularly strong this year and all of the box displays were exhibition fruit the classiest of any fruit we have seen at Spokane in the last five years. The Fruitgrowers' Conference was a strong feature of the show and was attended by several hundred enthusiastic fruitgrowers. Subjects pertaining to the fruit industry were discussed in a very intelligent manner, but perhaps the most gratifying feature of the meeting was the renewed interest in the fruit industry and the optimism and enthusiasm of the fruitgrowers of the Northwest over the future—a strong contrast compared with last year, when all fruitgrowers were depressed on account of low prices. It was also pleasing to note the prosperous condition of the fruitgrowers attending, as indicated by their confidence in the future and the liberal way in which they spent their money.

The December number, called our Diversity Edition, has met with a favorable reception, in fact many have written us and others have told us that it is just the right kind of an edition and in the nick of time to help the fruitgrower. The next issue will contain an article by the editor entitled "Brickbats and Bouquets," which will aim to show the value of diversity to the fruitgrowers. Future editions of "Better Fruit" will contain articles in reference to other crops or other products that can be produced by the fruitgrower in connection with fruit growing without interfering with his business, showing how to increase his income and how to conduct his business so as to bring in some extra money during almost every month of the year. This is a mighty important matter for consideration on the part of the fruitgrower at the present time; it is wise not to have all of your eggs in one basket and it is mighty comfortable to have some money coming in each month of the year instead of having your money come in all at once at the end of the fruit season.

The Spraying Edition. — This, the January number, is our Annual Spraying Edition, full of good general information upon the subject of pests and diseases. The following issues during the spring and early summer will contain further articles about spraying for each particular disease or pest in advance of its season and in sufficient time to give the grower an opportunity to inform himself by reading "Better Fruit" regarding the latest and best methods or formulas for spraying for all of the troubles the fruitgrower has to contend with.

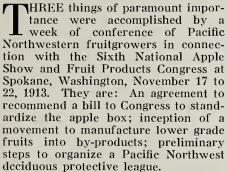
Advertising is the backbone of every publication. Through advertising "Better Fruit" is enabled to furnish the subscriber with a splendid fruit growers' paper, full of practical information, printed on book paper and handsomely illustrated. Inasmuch as we are enabled to do this through our advertising support, and as our subscribers get the benefit, we feel we are justified in suggesting that they patronize the advertisers of "Better Fruit," and we would respectfully request our subscribers when writing advertisers to mention the fact that they say the article advertised in "Better Fruit."

The prosperity of the fruit business is being indicated by the gradual and steady increase in our circulation. "Better Fruit" has carried more pages of advertising than any agricultural or horticultural publication west of the Mississippi River during the past eight years, which is about the strongest evidnce that we can present to the advertiser that "Better Fruit" gets results.



Sixth National Apple Show at Spokane

By Robert S. Phillips



Perhaps of most immediate and direct importance to every apple grower in the country was the report adopted recommending a bill to be passed by the United States Senate and House of Representatives standardizing the apple box and pack. E. H. Shepard of Hood River, Oregon, chairman of the committee on grades of the International Apple Shippers' Association, struck the keynote in introducing the standardiza-tion subject when he said, "This is the most important subject that will come before this conference." The bill to be proposed has been given the title "the Whistler bill," after C. E. Whistler of Medford, Oregon, one of its framers. A copy of this bill is included in an article in this issue on "Standardization of the Apple Box and Pack."

The second accomplishment of the National Apple Show conference was the launching of a movement to conserve the lower grade fruits by manufacture into by-products. H. C. Sampson, secretary-treasurer of the North Pacific Fruit Distributors, and the father of the Spokane conferences, was given a new task for still further display of his genius for investigation and organization by being made chairman of a committee to go to the bottom of this subject. With Mr. Sampson on this committee are W. H. Wicks, Moscow, Idaho, secretary of the committee; Paul H. Weyrauch, Walla Walla, Washington; D. D. Olds, Wenatchee, Washington; J. H. Chapman, Milton, Oregon; W. S. Brown, Corvallis, Oregon; J. F. Batchelder, Hood River, Oregon; C. J. DeVice, North Yakima, Washington; M. J. Higley, Payette, Idaho, and H. M. Sloan, Florence, Montana. The big problem of conservation of the fruit waste of the Pacific Northwest constitutes the task of this committee, which will meet in Walla Walla December 18 to plan its campaign. The work of this committee will be largely one of investigation. Data on freight rates, assembling rates, output, what percentage of the fruit is wasted and allied subjects will be gathered. Data on existing by-product plants of the Northwest will be sought, and the committee

will endeavor to recommend whether such plants should be co-operatively owned and managed or by independent owners; also whether it is wise to handle by-products through existing selling agencies or through separate organizations. The nature of this task makes it necessary for the committee to work slowly at best; it is not expected to report for several months and perhaps not until next year's apple show and conferences.

The third accomplishment was the appointment of a committee headed by N. C. Richards of North Yakima, Washington, to organize a Pacific Northwest Deciduous Protective League. On this committee are R. H. Parsons, president of the Northwestern Fruit Exchange, Portland; Ex-Governor Miles C. Moore, prominent banker of Walla Walla; Ex-Governor Frank R. Gooding of Idaho, who is heavily interested in development work in Southeastern Idaho; Commissioner of Agriculture J. H. Perkins of Olympia; E. H. Shepard, editor of "Better Fruit," Hood River, Oregon; Gilbert Allis, a prominent fruitgrower of the Bitter Root Valley, Montana; John Gellatley, ex-mayor of Wenatchee and a director of the Wenatchee Fruitgrowers' Association; H. C. Atwell, former president of the Oregon State Horticultural Society, of Forest Grove, Oregon. Mr. Richards is general coun-



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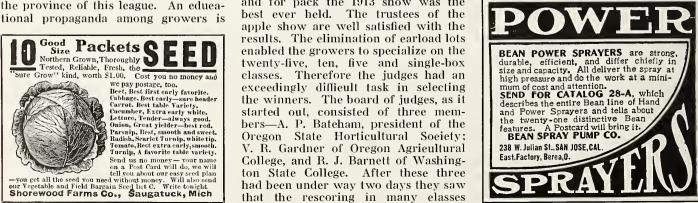
sel of the North Paeifie Fruit Distributors. Chairman Richards got busy immediately after the show and has sent letters to the committee members asking suggestions as to the nature of the work and as to when a meeting would be desirable. Through this league it is hoped to unite harmoniously the interests of all growers, shippers, independent dealers, selling organizations and bankers and those interested only indirectly in the fruit business. It is expressly understood that this organization shall have nothing whatever to do with the marketing of fruit, except only as freight rates, refrigeration and storage charges, tariffs, etc., are related to marketing. One of the most important objects is to fight orehard pests. Uniformity of laws is another big item that will eome within the province of this league. An educa-

pests. It is possible advertising the apple might be considered a logical work for the organization. In every particular the week of conferences proved successful. Every phase of orchard problems was discussed by men conversant with the various subjeets and much permanent good is eertain to follow. The show itself, as far as the aetual

display of splendid apples is eoncerned, was the best ever held. In size it did not compare with its five predecessors, but in the excellence of the fruit exhibited, in the neatness and compactness of the displays and in the general air of satisfaction evinced by all concerned the Sixth National Apple Show surpassed its predecessors. Growers generally agree that for quality of fruit and for pack the 1913 show was the best ever held. The trustees of the apple show are well satisfied with the twenty-five, ten, five and single-box classes. Therefore the judges had an exceedingly difficult task in selecting the winners. The board of judges, as it started out, consisted of three members—A. P. Batcham, president of the Oregon State Horticultural Society; V. R. Gardner of Oregon Agricultural College, and R. J. Barnett of Washington State College. After these three had been under way two days they saw

would make it impossible for them to cover the ground, so they called in H. J. Clark of Goldendale, Washington, and T. O. Morrison, deputy agricultural commissioner of Washington. A. P. Bateham, chairman of the board of judges, said the competition between entries was the keenest he had ever seen, adding: "The fruitgrowers are getting splendid and most beneficial results from this show, and the Spokane people who make this event possible are entitled to our thanks. I have visited all the national apple shows and I am frank in saying that this one excels all in the matter of service to the orehard industry."

There was a distinct difference noted between the attitude of growers at the eonference a year ago and that of this



A Revolution in Spraying that you should know about

Think first of the many disadvantages of Paste Arsenate of Lead—danger of freezing—their 50% water contents, inability to keep indefinitely, lack of suspension qualities, etc., then eliminate them in your mind and you have a clear conception of



Bulk for bulk showing actual comparison of same weights of S-W Arsenate of Lead and two other makes selected at random.

For those who still desire a paste material, we will continue to manufacture our New Process Arsenate of Lead. None better in this form.

SHERWIN-WILLIAMS Dry Powdered Arsenate of Lead. None to manufacture cess Arsenate of Lead. None to manufacture cess Arsenate of Lead. None to manufacture cess Arsenate of Lead.

the material that represents the greatest development in Insecticide manufacture. In addition to its superiority over pastes, it is a step in advance of present day dry Arsenates of Lead in its more finely divided condition proven by its bulk.

Greater bulk means better suspension, hence, a

more uniform and far reaching spray.

S-W Dry Arsenate of Lead has from 31% to 33% Arsenic Oxide thoroughly combined with lead assuring maximum killing power and minimizing the possibility of foliage injury.

Being in dry form, without water contents, it's all poison and therefore represents greatest economy. One pound of dry will produce the same results as two or three pounds of Paste Arsenate of Lead.

You cannot afford to experiment with Insecticides. That is a part of our business and how well we do it is best illustrated by our new Dry Powdered Arsenate of Lead—the material best adapted to your conditions. It has been tested successfully by leading Experiment Stations,

Write for folder giving test-tube evidence.

THE SHERWIN-WILLIAMS CO.

707 Canal Road, Cleveland, Ohio,

Portland, Seattle,

Insecticide and Fungicide Makers

Spokane, San Francisco, Los Angeles, Denver

ARSEMATE LEAD

All who this must be do

All who attended last year and this must be deeply impressed by the swift and favorable changes that have come to the orchard industry in a brief twelvemonth. A year ago gloom was the predominant note. This year there was confidence and courage. At the apple show conferences a year ago the growers demanded a co-operative selling organization. The North Pacific Fruit Distributors was the response to that demand. This year nearly all who spoke commended the work of that organization and urged that it be continued and broadened. The chaos of 1912 has given way to order and stability. In this beneficial transformation the North Pacific Fruit Distributors have played a large and important part. Truman Butler, a Hood River, Oregon, banker, said regarding the work of the distributors: "I am not underestimating the excellent showing which has been made by the various selling agencies, and in our district we hear nothing but the most favorable comment on the work of the association, which has handled ninety per cent of our crop. In fact it is generally conceded that the short crop is not the sole reason for our prices this year, and that to the splendid spirit of cooperation that has existed in the entire Northwest is due much of the credit for this year's returns."

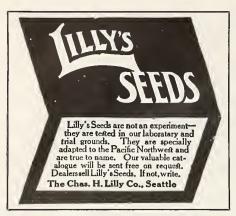
One of the most important and beneficial features of the show was the display of a large number of the winning exhibits in the show windows of ap-

proximately one hundred big cities of the East and South. This traveling apple show was made possible by the railroad companies which pierce the Pacific Northwest. The industrial and immigration departments of the railroads arranged to show the prize winners in the followings cities: Alabama, Birmingham, Mobile; District of Columbia, Washington; Delaware, Wilmington; Florida, Jacksonville; Georgia, Atlanta, Savannah; Connecticut, Bridgeport, Hartford, New Haven, Waterbury; Illinois, Chicago, East St. Louis, Peoria, Springfield; Indiana, Evansville, Fort Wayne, Indianapolis, South Bend, Tcrre Haute; Iowa, Des Moines; Kansas, Kansas City, Wichita; South Carolina, Charleston; Tennessee, Memphis, Nashville; Wisconsin, Milwaukee; Kentucky, Covington, Louisville; Louisiana, New Orlcans; Maine, Portland; Maryland, Baltimore; Michigan, Detroit, Grand Rapids, Saginaw; Minnesota, Duluth, Minneapolis, St. Paul; Missouri, Kansas City, St. Joseph, St. Louis; Nebraska, Omaha; Ohio, Akron, Canton, Cincinnati, Cleveland, Columbus, Dayton, Toledo, Youngstown; Rhode Island, Providence, Pawtucket; Oklahoma, Oklahoma City; Texas, Dallas, Forth Worth, Houston, San Antonio; New Hampshire, Manchester; New Jersey, Bayonne. Camden, Elizabeth, Hoboken, Jersey City, Newark, Passaic, Paterson, Trenton; New York, Albany, Buffalo, New York City, Rochester, Yonkers, Schenectady, Syracuse, Troy, Utica; Massachusetts, Brockton, Fall River, Cambridge, Holyoke, Lawrence, Lowell, Lynn, New Bedford, Somerville, Springfield, Worcester; Pennsylvania, Allentown, Altoona, Erie, Harrisburg, Johnstown, Philadelphia, Pittsburg, Reading, Scranton, and Virginia, Norfolk, Richmond.

A word as to the men who made possible the Sixth National Apple Show: James S. Ramage, a Spokane business man, was at the head of the board of trustees, which included men from all parts of the Pacific Northwest. Gordon C. Corbaley, secretary-manager of the Spokane Chamber of Commerce, was manager of the show, and he kept it comfortably within the fund set aside for the purpose. On the board of trustees were: Paul H. Weyrauch, Walla Walla, Washington; H. F. Davidson.



50-gallon barrel delivered to any railroad station in the United States, \$30



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Choice fruit trees of the leading varieties, small fruits and ornamental stock at reasonable prices, direct to the planter. Send for price list.

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and Northwest Native Plants are good for potting in the home, office or porch and planting out in the lawn or garden. I collect them from forest and logged lands. Prices range from 3 cents to \$1.00 each. Varieties and prices given on request.

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311 Morrison Street PORTLAND, OREGON Hood River, Oregon; M. J. Higley, Payette, Idaho; J. A. Perry, Medford, Oregon; E. S. Russell, Wenatchee, Washington; O. M. Morris, Pullman, Washington; J. E. Shannon, North Yakima, Washington; W. H. Wicks, Moscow, Idaho; Fred Whiteside, Kalispell, Montana; James S. Ramage, M. E. Hay, H. C. Sampson, J. M. Watkins, H. J. Neely, F. H. Lloyd, C. E. Hickman, A. L. Flewelling, J. C. Barline, N. W. Durham, W. T. Day, Orris Dorman, Sidney Rosenhaupt, H. H. McLane, W. J. Kommers, A. G. Hanauer, Henri Crommelin, all of Spokane.

A 1914 National Apple Show is assured and preparations for it will be started with the opening of the new vear. This will enable the trustees to make their plans on a more thorough scale and to arrange more intelligently than if they waited until late summer

or early fall.

Sgobel & Day of New York are pioneers in the apple business. They handled the first car of apples from Hood River five years ago, and they state they shipped the first box of apples to South America from New York. They report a steamer recently sailing from New York carried 30,000 boxes of Northwestern apples for South American ports.

According to government statistics the State of Washington has 198,705 acres planted to trees. Last year's planting showed the Yakima country to be in the lead. Okanogan came second and Grant County third. The planting decreased this year compared with previous years.

Mr. Judd S. Fish of The Dalles was appointed by Governor West as one of the committee from the State of Oregon to meet visitors at the Land Show in Chicago.

Grand Forks Fruitgrowers' Association of British Columbia shipped about fifty cars of apples, which brought the growers very satisfactory prices.

Mr. E. A. Ryerson of Dayton, Washington, shipped thirteen cars of apples, all of which are said to have brought satisfactory prices.

Prices Below All Others I will give a lot of new sorts free with every order I fill. Buy and test. Return if not O. K.—money refunded. Big Catalog FREE Over 700 illustrations of vegetables and flowers. Send yours and your neighbors' addresses. R. H. SHUMWAY, Rockford, Illinois

The Famous **Aetna Brand**

of strictly pure Lime and Sulphur Solution endorsed and recommended by our leading horticulturists. Read what some of them say of the Aetna Brand:

W. K. Newell, President State Board of Horticulture: "I have used the Aetna Brand in my orchard for years and I am sure you are making a good article."

A. C. Goodrich, Commissioner First District: "I have used and found every barrel full up to test and very free from sediment."

H. C. Atwell, ex-President Oregon State Horticultural Society: "I don't think there is a better spray made." S. J. Galloway, Fruit Inspector Washington County: "After very severe tests I find the Aetna Brand O. K."

My 25 years of orchard study enables me to manufacture the best on the market. For prices in small or large quantities, write to

B. LEIS, Beaverton, Ore. The Aetna Orchards



A Bargain Collection of FLOWER SEEDS

FOR 12 CENTS

10 choice varieties, all new, fresh seeds, sure to grew and bloom this season, Pansy, 60 Colors; Phlox, 10 Colors; Verbena, 18 Colors; Pottunia, 10 Colors; Martina, 10 Colors; Martina, 10 Colors; Mighamotte, mixed and Sweet Allyssium. The 10 Packages only 12c.

With each order we **GOOD POULTRY** also include a copy of a quarterly magazine, devoted to special crops and intensive farming, with special attention to the care and handling of poultry. Tells how to make \$200 per acre per year on any farm from 5 to 100 acres, Good Poultry alone, Ide a copy; 25c a year. Order now, write tonight—for Flower Seed Bargain List, A. SHOREWOOD FARMS CO., Saugatuck, Mich.

During the months of June, July, August and September Wenatchee shipments of fruit amounted to 1,085 cars, against 1,222 last year. This shipment consisted of cherries, pears, peaches, apricots and summer and early fall apples.

Shippers of Fancy Western Box

Apples, Peaches Plums and Pears

desiring reliable quotations and information concerning conditions in the sixth largest market in the United States, communicate with us promptly.

SPECIAL FEATURES - Absolute Financial Responsibility, Competent Service. No house in any market excels us in making prompt remittances when shipments are sold. Always glad to make liberal advances on consignments.

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WHOLESALE DRUGGISTS AND DEALERS THROUGHOUT THE UNITED STATES

POWERS-WEIGHTMAN-ROSENGARTEN

Manufacturing Chemists Founded 1818

NEW YORK PHILADELPHIA

SAINT LOUIS

Spraying in Australia By W. J. Allen, Sydney, New South Wales, Australia

THIS operation is now looked upon by all progressive fruitgrowers as work which must of necessity be carried out, as they realize that a tree covered with scales and other pests can no more yield fruit which commands the attention of buyers than can an orchard where the cultivation, pruning and manuring are left to nature's sweet will. There are still, however, a number of growers who have not realized the importance of this feature of the work and a certain percentage of fruit is lost annually, much of which, by the timely application of a spray, could no doubt have been saved. It must be distinctly understood that in ninety-nine out of a hundred orchards spraying is absolutely essential. Diseases may not occur every year, but experience has shown that they recur frequently, and in years of serious epidemics the profits from spraying are so great that the grower can afford to spray regularly as an insurance against loss. The following are four operations upon which all permanent success in fruit culture largely depend, viz., cultivation, manuring, pruning and spraying. Spraying is the last, but not the least important.

In the treatment of pests and diseases the principal point is what remedy to Then comes the point of supplying it. The orchardist must identify the cause of his trouble, bccause as a rule insecticides are of no use against fungous diseases and vice versa. There can be no doubt whatever in the mind of up-to-date orchardists that the annual winter dressing of lime-sulphur or bordeaux mixture is of very great bencfit to the trees. Most growers know (for seeing is believing) the great loss caused by injurious insects and fungous diseases, but only a few realize as yet that this loss is really a benefit to every up-to-date grower. For as it is known that this loss can be prevented by intelligent effort, it is only the won't-be-convinced, non-thinking orchardist who will not put spraying into practice. This gives the energetic and progressive man an immense advantage. The demand for inferior fruit does not pay expenses because it has no chance of sale alongside the choice fruit. Spraying, of course, means

work—and disagreeable work—but it pays for itself in the increased market price obtained for the fruit.

However, the work must be done intelligently or the time and labor are wasted. Thorough, intelligent spraying means the use of a good spray pump and outfit, and above all a knowledge of the enemies to be treated and of the

GOULDS SPRAY PUMPS

JHEN You Buy a Goulds Sprayer

You are not buying for this year or next alone—but for years to come. With it you have a guarantee that it will do the work as it should be done year after year-and the guarantee is by a manufacturer whose reputation for high quality and fair dealing has been known the world over for more than half a century.

"How to Spray, When to Spray. Which Sprayer to Use"

An interesting and valuable book that tells about sprays and sprayers, gives valuable formulas and complete spray calendar. We want everyone who sprays to have this book. Free.

Our 1914 Catalog

tells about Goulds pumps, spraying materials, pruning tools and other things of interest to growers, and will be mailed free, together with the Goulds and Corona books.

Ask for Catalogs Nos. 200 and 204.

Dry Powdered Arsenate of Lead Soft as Cotton, Fine as Flour

Made by a newly discovered scientific chemical process. Highest per cent. of killing power.

> Contains nothing but lead oxide and arsenic oxide. oxide and arsente oxide.
>
> Superior to all other arsenates of lead—dry or paste. Stays
> mixed longer without settling. Spreads
> more evenly. Slicks to branches, leaves
> and fruit. Mixes quickly and easily in
> water. No sediment, lumps or waste.
> Never clogs spray nozzles.

Corona Dry Powdered Arsenate of Lead

The first—and only—satisfactory arsenate of lead. Simple, clean and easy to handle. Cannot freeze, dry out. cake, or lose its strength. Combines convenience, economy and efficiency. Always a uniform strength of spraying solution. Positively kills and exterminates apple worm and plum curculloand alleaf-eating insects. Only one pound to fifty gallons of water. The great ORCHARD SAVER. Write for figures, testimonials and sworn tests. figures, testimonials and sworn tests.

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Ten pounds makes 100 gallons. Saves freight. Costs but one-half as much as Lime-Sulphur. Dissolves quickly. Won't clog nozzles.—Write us.

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"The Bean is the Best"-it's a strong statement but we are prepared to back it up. We call your attention to the 21 Distinctive Bean Features, including Bean Patented Pressure Regulator, Threadless Ball Valves, Porcelain-lined Cylinders, Bean Refiller, Underneath Suction, Bean One-Piece Steel Frames, Rocking Bolster, etc. Such features as these can't be developed in a month—we have been at it for 27 years.

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It Illustrates and describes the entire Bean line of Hand and Power Sprayers and Pump Accessories and explains the 21 Distinctive Bean Features in detail. Don't buy a sprayer of any kind till you get this book.

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JOB WANTED

By practical orchard and ranch man. Executive ability as foreman; strictly temperate. Best possible reference given. Nine years' experience in Grand Valley, Colorado, and Idaho. Send full particu-lars. Address Box S, "Better Fruit."

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to our bargain list of Choice Fruits, Flowers and Forestry Stock. For \$1.00 cash we will send you postpaid, 6 each, Carmen and Elberta peaches. Nice, stocky little trees. For \$5.00 cash we will send 50 each Carmen and Elberta, the leading market peaches today, postpaid. Get our Bargain List now.

Western Department
Atlantic Nursery Co., Inc., Berlin, Maryland

Position Wanted

By an experienced horticulturist, foreman of a fruit ranch. Some college training; married; temperate; executive ability, and not afraid of work. State salary in first letter. References. F. W. SABRANSKY, Route 12, Hillyard, Wash.

Position Wanted

By orchard foreman, who is a graduate of the best horticultural school in the country. Has had plenty of practical experience. Has charge of a large pear and apple orchard at present time. Good references. Address Box L, care "Better Fruit."

remedies found to be most effective, their preparation and the proper time for the application. Prevention of fungous diseases is possible, but their cure is hardly practicable. When failure occurs it may generally be attributed to the lateness of the application. Spray in time and study the sub-

ject fully.

Spraying is not a cure-all. It will not bring back life nor restore the lcaves after they have been eaten off by caterpillars. The best results are not always obtained the first year, especially when spraying for fungous diseases. Success in spraying will only be found by thorough attention to details. The spray must actually reach every point which it is intended to pro-In applying winter sprays a coarser nozzle can be used than for summer sprays, because the object is mcrcly to form a complete coating of the spray over the wood. In summer spraying, however, an exceedingly fine, mist-like spray, reacing every portion of the plant and covering with minute dots, preferably no larger than a pin's head, every square inch of the foliage. is necessary. The nature, causes and remedies for pests and diseases are often very uncertain; therefore unscrupulous people attempt to make money by selling quack remedies. Be very careful in buying mixtures to obtain them from reliable firms only, and after they have been thoroughly tested.

Most diseases of plants are caused by low forms of vegetable life known as fungi, which live upon and within the tissues of the higher plants. The main difference, other than size, between the fungi and the higher plants is the lack of the green coloring matter so abundant in the higher order of vegetation. The methods of development in the fungi are often different from those of higher plants and their microscopic size renders their study more difficult. The parasitic fungi spend the winter months mostly within the living and dead vegetable tissues, and during the early spring days send out small spores which correspond to the seeds of the higher plants. These spores are dis-seminated by the wind and other agents from plant to plant. With favorable conditions as to moisture and warmth

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July and August of 1906 February, March and April of 1907

in good condition

please write us. We want one number of each, so the first one answering this advertisement will receive the order. We will pay \$1 apiece for each copy of the numbers requested.

BETTER FRUIT PUBLISHING CO.

Horticulturist-Superintendent Wanted

February 1, by large land owners in British Columbia irrigation belt. Must be thoroughly experienced in all phases of orchard work, raising vegetables, small fruits, fodder, hogs, stock, poultry, and understand farm machinery. Must be congenial, educated, sober and a hustler; understand handling men. Good position for right man. Don't apply unless qualified. State age, experience, training, adaptability, wages, and size of family, if any. Apply COLUMBIA VALLEY ORCHARDS, Golden, B. C.

AN EXPERIENCED ORCHARDIST

wants a position as manager or foreman of an apple orchard. Have had experience in irrigation, Can handle either young or bearing orchards. Have had some experience with small fruits. Two years University of Illinois Horticulture. Ten years experience, one in Idaho. Best of references. (Address) H. O. HINKLEY, DuBois, Illinois.

NON-RESIDENT OWNERS AND PROSPECTIVE OWNERS

Will investigate and make reports on orchards and farms for your interests. Have been connected with large realty operators for years and am intimately acquainted with many large subdivision propositions. References furnished. Write for further particulars, rates and estimates. H. D. EISMANN, Grants Pass, Oregon.

Yakima Valley Orchard

20 acres; 10 acres in best varieties winter apples, just beginning to bear; 10 acres in alfalfa; small house, barn, large cement cistern. Bearing orchards on all sides. Title and water right perfect. Price \$300 per acre; \$2,000 cash. Address V. L. GEORGESON, Prosser, Wash.

the spores send out small branches which penetrate into the living tissues of the higher orders of plants. By the application of a fungicide to a plant we destroy the spores which have found lodgment upon it, and thus prevent the development of additional spores which would cause disease. Just as long as the tissues of plants are covered with a thin, even coating of fungicide very few fungi can develop upon them. Thus, if a fungicide is applied at regular intervals of about two to four weeks during the spring and early summer, most of such plant diseases may be held in check. A fungicide is a preventive, and its application should begin long before the disease has advanced far enough to manifest itself to any extent. Orchardists should profit by the experience of former years, and when grape vines or apples, etc., are affected any year with black spot or other fungous disease they should begin spraying with a fungicide the following season long before the time of

There is a great difference in the manner in which insects take their food. Some eat the leaves, while others suck the plant juices. Orchardists must know to which of these two classes a particular insect belongs in order to know what remedy to apply. Insects which eat the leaves have their mouth parts formed for biting off pieces of vegetable matter, and in this way eat their food in much the same manner as do the higher animals. The insects which suck the plant juices have their mouth parts formed into a beak, which is inserted into the plant tissues. The most notable amongst insects which chew their food are the codling moth and vine caterpillar. These insects can be destroyed by a stomach poison (insecticide)—a poison which kills the insects when taken into the stomach along with the particles of food. We apply this class of insecticide to the plants, making no effort to apply it directly to the insects.

the appearance of the disease.

Scale insects are small sucking insects, which must be killed by a contact insecticide, applied directly upon them, which will kill them by penetration and irritation. Hydrocyanic acid gas is also used and has proved most efficient.

Plant lice are the insects so common upon a great variety of plants throughout the early spring and summer. They may be green in color or black, such as green aphis or black aphis. Some are red. Plant lice may or may not have wings. The most common forms during the summer months are the wingless females which produce living young; winged males generally appear in the autumn. Aphides are the most common form of plant lice, and the treatment for them is an external irritant insecticide.

Continued in next issue

The Department of Commerce, Washington, states that Brazil is a good purchaser of California prunes, as they pay at the rate of 65 to 75 cents per pound, and consider them delicacies.

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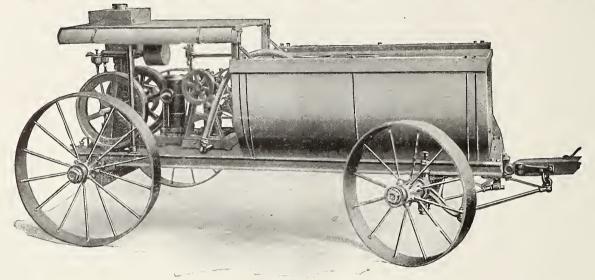
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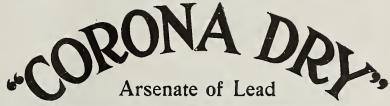
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Oil Sprays—Five Years' Successful Use/

Mr. Paul R. Jones, Manager and Entomologist, Balfour, Guthrie & Co., San Francisco, before Washington State Horticultural Society

IL preparations have been used the past fifteen years or so by entomologists throughout the United States for the control of various insects during the winter or dormant season, and also in the summer time. All of these preparations have been used against sucking insects, and are primarily contact insecticides. Their method of killing has never been especially studied, except that Mr. G. D. Shafer of the University of Michigan has thrown some light on this subject in his paper, entitled "How Contact Insecticides Kill." The heaviest of the oil preparations for use as insecticides probably kill in two ways-first, by forming a smothering blanket over insects such as scales, and, second, by the more volatile portions penetrating through the spiracles or breathing pores and snuffing out the life of the insect. The vapors or gases probably give the first action, the insect being affected somewhat as a person is when taking an anaesthetic. The higher gravity oils, such as kerosenes and products such as xylol, etc., probably act by penetrating the breathing pores of the insect, dissolving the fats and paralyzing the nerve centers. All of the insecticides of this type act much more rapidly than the ones made from crude oil or crude oil residiums. It is not the purpose of this article to go into the technical manner in which these preparations kill, but to give a general resume of the different types of oil and oil preparations that have been used in the past throughout the United States, with special reference to the Pacific Coast, incorporating the types of oil used and the ones that should be used, manner of making emulsions and miscible oils, the insects against which they should be used, safety to the tree from these preparations and the cost of the

It might be well to state that the speaker has been engaged in experimental and demonstration work for the control of various insects on the Pacific

treatment.

slope for the past five years, in connection with the United States Bureau of Entomology mainly, and later in the manufacture of contact insecticides from oil preparations. While in the government service it was the speak-

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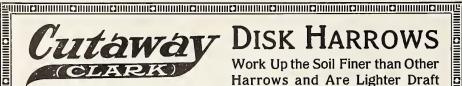
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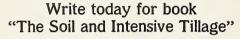
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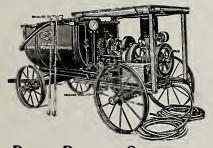
er's good fortune to be engaged in and have charge of, along with Mr. S. W. Foster, formerly of the Bureau of Entomology, in the actual spraying and the supervising of spraying of from ten to twenty-five thousand acres a year with oil emulsions and miscible oils. The experience gained was on practically all of the varieties of fruits grown in the West, and was in different sections of the country under various conditions, where many types of oils were used during the spring, summer and winter spraying.

The results of some of the tests against the common brown apricot scale and the European or Italian pear scale for three years were published in Bulletin No. VIII, part VIII, Bureau of Entomology, and give the comparative killing effect of some of the oil sprays, such as distillate oil emulsion, crude oil emulsion, with a number of other standard contact insecticides. It is hardly advisable here to go into detail regarding the results obtained, but it may be mentioned that as a general clean-up spray for the dormant season crude oil emulsion, at about a ten per cent strength, gave the best general results for these insects, and also as a means of control for heavy infectations of moss and lichens. Although not published separately, experiments have been carried out during the past five years for the control of the black and white scale (Eulecanium cerasorum), the almond red spider, the black scale, the eggs of the apple aphids (Aphids pomi and Aphids sorbi), the hemispherical scale, the cottony maple scale, the San Jose scale and the pear-leaf blister mite. Besides this, the speaker has had opportunity to try out various oil preparations for summer use against the pear thrips, orange thrips, many species of aphids and most of the common citrus scales, together with the citrus mealy bug and red spiders. For winter use crude oil emulsion and miscible oils invariably gave higher killing results against the more resistant scales, especially if the infestation was severe, than did lime-sulphur, on account of its being able to penetrate through the heavy incrustations of these scales, and these products were especially adapted for the lecanium group of scales, against which lime-sulphur is peculiarly not effective.

Several types of oil have been used for insecticides both in the East and in the West, and can be classed as oils for winter use, such as crude oil, untreated, direct from the well; fuel oil, which is commonly called crude oil, but which is in reality a topped crude oil, that is, the various crude oils are run through a process which takes off all volatile preparations such as gasoline, benzine, kerosene and some of the stove, gas and lubricating distillates. The various distillates, such as are known under the trade name of stove distillate, gas distillate, lubricating distillate and kerosene, have been used at times both in the West and in the East, especially in the West, for the preparation of different oil emulsions and miscible oils.

Sometimes the oil used may be nearly a straight crude or it may contain parts of the other distillates or kerosenes. The public in general and the majority of the entomologists know very little regarding what oil to use or to ask for, and know still less concerning the oil after they obtain it from the oil companies. The oil companies, on the other hand, know nothing regarding which type of oil is best adapted for making these emulsions, or which have the best physical characteristics for use in the field against the different insects and which are safe to the trees at the strengths at which they should be used. This state of affairs has resulted in considerable agitation throughout the United States and has caused a great deal of dissatisfaction throughout the East especially, where several cases of oil injury have shown up.

Three main types of oil sprays have been used-mechanical mixtures, mechanical emulsions and emulsions of the miscible oil type. A mechanical mixture is essentially a mixture of oil and water at high pressure, and for the most part distillates running from 28 to 34 degrees and crude kerosenes have While many experiment been used.



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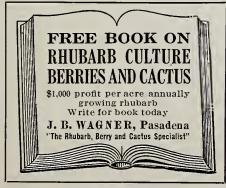
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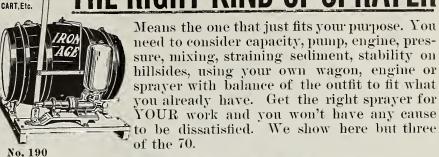
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stations still recommend this easy process of using oil sprays, the speaker has never, and cannot conscientiously, recommend this type of an oil preparation, since eventually the oil separates out on the tree, and if there is any trouble at all with the spraying outfits in the way of agitation considerable injury is liable to result. The next type of oil sprays are mechanical emulsions or those in which the oil is emulsified by high pressure with a certain quantity of whale-oil or fish-oil soap in hot water, making a stock solution. Most of these stock emulsions run from fifty to sixty-six per cent in oil content and are diluted according to the work in prospect, whether they are for summer or winter use. The oils which have been used for this purpose are mainly kerosenes, 28 to 34-degree distillates of various kinds, and some crude oils, although the latter usually forms too

thick a stock solution by this process. Classed along with these would come the distillate and crude oil emulsions which are made by the fruitgrower at home for immediate use in the spray tank by whale-oil soaps, but which are not stock solutions. This is usually done by dissolving a certain amount of whale-oil soap or liquid soap or oleic acid, which is a fatty acid in conjunction with some alkali, to form a strong soapy solution, and then while the agitator is running to slowly pour in the distillate or crude oil, whichever is to be used, thus forming a very good temporary emulsion. Emulsions of this type and of the stock emulsion type by mechanical emulsification are much to be preferred over the straight oil and water mechanical mixtures, but still have the disadvantage in that the stock emulsions will not stand from one season to the next and are broken down by

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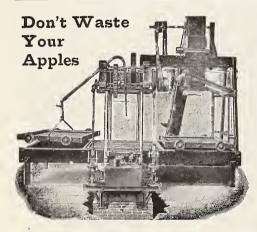
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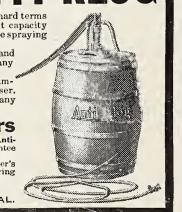
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the heat, such as the sun's rays, or they do not stand up so permanently when diluted as those of the miscible oil type.

The term miscible oils is rather a broad one and includes those types of oils or potential emulsions which include all soluble oils or those oils miscible in water. The process used for making these oils soluble vary greatly. The main principles used in the East are a mixture of mainly mineral or hydrocarbon oils of a paraffine base and vegetable oils such as the linseed oils and some of the creosote oils, so that these miscible oils will mix readily with water. The amount of water present in these miscible oils is a very decided factor in whether one has a perfect miscible oil or not, as, for example, sometimes the miscible oil may look perfect but will not mix readily with water, whereas if a few more drops of water are added to the concentrate no change can be seen in the miscible oil itself, but it will then mix very readily with water. Water, therefore, plays a very important part in helping to emulsify or in making those oils miscible. Most of the Western types of miscible oils are made by a slightly different process, such as taking a suitable mineral or hydrocarbon oil, a vegetable oil like whale oil or fish oil, and sometimes a creosote oil or a preparation of carbolic acid or cresylic acid, commonly known as cresol, the latter being much better and more commonly used. The Western process is much to be preferred over the Eastern one in that the various substances used for making these oils miscible are much safer to the tree, and by using a high-grade 98 per cent cresylic acid instead of a low-grade creosote oil or carbolic acid running low in phenols (where a considerable portion of foreign matter exists which is not necessary for the emulsification of oil and which is liable to cause injury to the tree), a much more perfect product is produced. All of these various oils such as crude oil, the different types of distillates and kerosenes and xylol (which is now being extracted form California petroleum) require different soaps for emulsifying them or making them miscible in water. It is needless to say that one should adopt the right kind of an oil for the purpose for which it is to be used, such as the insects to be controlled and the varicties of trees to be treated, otherwise there is both a loss of time and money expended and some liability to injury.

A great deal of agitation has been stirred up at times in the East regarding oil injury or the injury by this type of spray. This factor has shown up in the East many times, but the speaker has failed to see a single case of bad oil injury in the West, due primarily to the fact that the Western oils are made from an asphalt base, while those in the East are from a paraffine base oil, the latter being much more penetrating and not forming so stable an emulsion or miscible oil. Furthermore, the Eastern process of using linseed oil and creosote oils for making



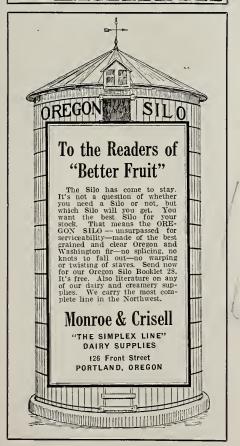
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their mineral oils soluble in water show much more liability to injury. Another factor is well known among oil men, and that is that the same type of oils in the East run much higher than those in the West, as, for instance, Eastern gasolines will run from four to six degrees higher on the Baume scale than the same gasolines in the West. This applies in a general way to the kerosenes and other oils, and even the crude oils of the East run higher in gravity than our Western oils as a general thing. Therefore the same type of oils in the East will give more penetration and are more liable to injure than those in the West. A still further factor is in evidence from the fact that there are more saturated hydrocarbons of the aromatic series, such as xylol, toluol, cumol, or what is generally known as the benzine group (this must not be confused with the ordinary benzine, which is really a low-grade gasoline), present in West-ern asphalt oils than there are in the Eastern paraffine base oils. These aromatic hydrocarbon oils lend themselves to more stable compounds than the true paraffine or aliphatic series of hydrocarbons, such as gasoline, kerosene, etc., and which make up practically all of the Eastern paraffine oils. Western asphalt base oils have been used by the speaker in degrees of strength from two per cent up as high as fifteen per cent without any injury showing up, except in a few cases a few buds were killed where the oil emulsion was used too late in the season as a dormant treatment. This same trouble would show up in the use of other insecticides during the spring and summer season if the materials were used at a winter strength. speaker has had actual experience, as mentioned before, in the use of these different oil preparations during the past five years and has failed to see a single bad, or even moderately bad, case of oil injury. Furthermore, he has seen certain pear orchards in the Santa Clara Valley which have been sprayed continuously for the past ten or twelve years with oil preparations during the winter time, and which at present are in the most vigorous state of health, and show no sign of injury at all.

Aside from the actual killing of the insects in question, the speaker has noticed for several years the stimulating action of oil sprays both as a winter treatment and spring treatment for pear thrips on different varieties of fruit; also on young trees at an age of from six to seven years which had no scale at all, but which happened to be sprayed by the fruitgrowers with these oil preparations and which have been under observation at various times. In practically every case there has been a stimulation to the trees, whether it is due to the softening of the bark or whatever else, and these trees have usually come into bloom several days earlier and have invariably produced heavier crops than those in the same orchard which were not sprayed.

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The cost of using oil preparations in comparison with other standard insecticides on the market will sometimes show in favor of the oil preparations and at times in favor of the other insecticides. Sometimes this will depend upon the insects treated and the severity of the attack. Home-made oil emulsions in general are about as cheap as home-made lime-sulphur preparations, and prepared emulsions and miscible oils cost about as much as the commercial lime-sulphur preparations, depending, of course, on the locality, the amount of freight and to the cost of preparation. Invariably one good dormant treatment with a suitable oil emulsion or miscible oil will be cheaper for very severe cases of San Jose scale and oyster-shell scale than the two treatments required where lime-sulphur is used. For summer work these various miscible oils, distillate oil emulsions and kerosenc emulsions should be diluted down considerably, and to give the highest possible efficiency should be mixed with nicotine or Black Leaf-40 for the control of sucking insects such as plant lice, etc. While nicotine is very effective against different types of insects on account of the drops of the spray being so large and showing no penetration, they are always improved by the addition of an oil cmulsion which breaks down the surface tension of the water, making in the spray much finer globules, causing it to have more penetration against these insects, especially the ones which have some kind of a greasy or waxy covering. The speaker will not indulge in any remarks concerning the different preparations on the market or where these various oils, both for the making of home-made emulsions and the prepared products, can be obtained, but will merely state that fruitgrowers before using oil sprays should secure the advice of some competent man who has had experience along these lines, and try to get oil preparations which are adapted for the purpose for which he requires them.

Mr. W. A. Ritz of Walla Walla has been elected president of the Walla Walla Fair Association, succeeding Mr. Thomas H. Brents.

The shipments of fruit from the Okanogan Valley of British Columbia during the past season are estimated at a little less than 2,000 cars, which will return to the growers approximately \$1,250,000.

The Northern Pacific Railway pulled off a great publicity stunt for "King Apple" in Portland on "Apple Day," November 18, by distributing from a float 25,000 magnificent red apples. They also boosted the apple business by serving apples on every dining car in the following ways: Apple fritters, apple croquettes, apple pancakes, fried apples, apple sauce, baked apples, apple dumping, apple charlotte, apple cobbler, and as side orders, dressing and stuffing with the general roast meats and fowls.





152 Walnuts on a Vrooman Franquette **Tree Four Years** after Planting

Such is the record of Mr. L. E. Blain's Vrooman Franquette tree in Albany, Oregon, and there are scores of other trees bearing at the same age —some even younger. The Vrooman Franquette is naturally a young and heavy bearer. It is also recognized as being the best all-around hardy walnut tree on the market; it is a late bloomer and self-fertile. The nuts are large, with fully developed kernels of unusual delicate richness; thin, well sealed shell, which retains the flavor and moistness. Space here allows giving only limited description and information. Let us send you our special literature. It will benefit you. We are the original introducers and propagators of the Vrooman Franquette. Beware of substitutors. You will get the genuine Pure Strain Vrooman Franquette if you secure trees from us or our salesmen. Inquiries promptly and carefully answered.

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SPECIALTIES: FANCY APPLES AND PEARS

The Jonathan Fruit-Spot

By W. M. Scott, formerly Pathologist, and John W. Roberts, Assistant Pathologist, Fruit Disease Investigations

In February, 1911, the senior writer published a preliminary report on "A New Fruit Spot of Apple," in which he stated that the cause of the disease was unknown, but that there was a strong suspicion of injury produced by arsenate of lead used in spraying. It was also stated that the fungi Cylindrosporium pomi Brooks and Alternaria sp. were isolated from a few of the spots, indicating a possible connection of one or both of these organisms with the disease.

The results of spraying experiments and further laboratory studies conducted by the writers show that the spots are not due to arsenate of lead injury and probably are not caused by any vegetable organism. The spots, though seldom more than skin deep, detract greatly from the appearance of the apple and afford a place of entrance for decay fungi. They are dark brown in color, more or less circular in outline, at first scarcely depressed, later becoming considerably sunken, and vary from one-eighth to three-fourths of an inch in diameter. They resemble very young bitter-rot spots and are not easily distinguished from the advanced stage of the New Hampshire fruit spot (Cylindrosporium pomi Brooks). As many as twenty-five spots often occur on one apple, and a lenticel usually forms the center of each spot. Since the spots are entirely superficial, the intrinsic value of the fruit is not seriously affected, but its market value is greatly reduced.

The disease occurs only on fully matured fruit and usually develops after the crop is picked. If left on the trees long after maturing the fruit of susceptible varieties may become affected before being picked. This was observed on the Jonathan variety in Virginia and West Virginia during the fall of 1911. According to numerous observations made by the writers, fruit picked at the proper time, or rather early, and rushed into cold storage with only two or three days' delay, and consumed within a few days after removal from storage, will not develop the disease to any serious extent. Fruit of

susceptible varieties kept in common storage or delayed in reaching cold storage usually becomes affected. The disease has been particularly annoying to fruitgrowers who have attempted to keep prize specimens of the Jonathan in cellar storage for exhibition purposes. The growers of Esopus (Spitzenberg) in Oregon and Washington have perhaps suffered most from this trouble, the spots often developing on the fruit en route to the Eastern mar-

kets. The writers have observed large quantities of affected fruit from the Northwest in the markets of Washington and New York.

The Jonathan is the most susceptible variety grown in the East and its commercial standing is greatly impaired on account of this weakness. The disease is now rather commonly known among apple growers as the "Jonathan spot," and for that reason the writers have adopted the name "Jonathan fruit-spot."







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M. V. RICHARIDS, Land and Industrial Agent Room 13 Southern Railway Washington, D. C.



The Esopus is almost, if not quite, as susceptible to the disease as the Jonathan, and the Yellow Newtown apparently ranks third in degree of susceptibility. It has also been observed to a very slight extent on the Grimes, Arkansas Black and a few other varieties of less importance.

Dry weather during the summer is apparently favorable to the development of the Jonathan fruit-spot. It was very bad in 1910 and 1911, both of which were dry seasons, while in 1912, a comparatively wet season, it was not common on Eastern-grown fruit. In the fall of 1911 the spotting was particularly serious on the Jonathan, specimens having been received from practically every section of the country

where that variety is grown.

In order to test the supposition that the Jonathan fruit-spot might be due to arsenical injury, spraying experiments were conducted in the orchard of Mr. S. H. Derby, at Woodside, Delaware, during 1911. A block of Jonathan apple trees about fifteen years old was divided into five plats of six trees each and treated as follows: Commercial lime-sulphur solution at the rate of one and one-quarter gallons to each fifty gallons of water was used in connection with arsenate of lead on all of the sprayed plats. The amount of arsenate of lead was varied from one-half pound to five pounds in each fifty gallons of spray. Plat I was sprayed with one-half pound, plat II with one pound, plat III with two pounds and plat IV with five pounds of arsenate of lead to fifty gallons of the diluted lime-sulphur solution. Three applications were made in accordance with the usual directions for the control of the codling moth, i. e., (1) as soon as the petals fell, (2) three weeks later and (3) ten weeks after the petals fell. The trees were thoroughly sprayed each time, so that the fruit remained coated with the arsenate of lead well on toward picking time. Plat V was left unsprayed as a check. The crop was picked on September 12 and found to be practically free from insects and diseases. No spotting was discernible at this time. Two boxes of fruit from each plat were immediately shipped to Washington, reaching the laboratory on September 15, three days after picking. On this date a careful examination revealed no indication of the disease on any of the fruit, sprayed or unsprayed. One box from each of the five plats was then placed in cold storage, while the remaining five boxes were stored in a moderately cool basement.

The basement-stored apples were examined on September 30 with the following results: The fruit from plat I

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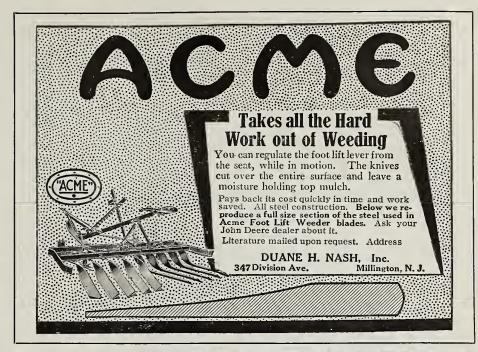
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showed 41 per cent affected with the Jonathan fruit-spot, plat II 52 per cent, plat III 36 per cent, plat IV 36 per cent and plat V (check) 46 per cent. A reexamination of the same apples on October 23 showed plat I to have 56 per cent of the fruit affected, plat II 70 per cent, plat III 52 per cent, plat IV 42 per cent and plat V (check) 64 per cent. Many of these apples were seriously injured, being literally covered with spots measuring from 5 mm. to 1 cm. in diameter. These results show that unsprayed fruit may become quite as badly affected with the Jonathan fruitspot as fruit sprayed with arsenate of lead. An unusually heavy dose of the poison, as shown in the results from plat IV, which was sprayed with five pounds of arsenate of lead to fifty gallons of water, did not increase the amount of affected fruit.

The fruit which was placed in cold storage was examined on November 10 and all of it found to be free from the disease. Finally, on December 18 these apples were removed from cold storage and examined with the following results: Plat I had 5 per cent of its fruit spotted, plat II 10 per cent, plat III 20 per cent, plat IV 14 per cent and plat V (check) 33 per cent. In most cases the spots were small, inconspicuous and few to an apple, being in these respects in great contrast to those appearing on the basement-stored fruit. The cold storage prevented the spotting for at least two months, and at the end of nearly three months this fruit was not nearly so much affected as the cellar-stored fruit was at the end of six weeks.

On September 25, 1911, one bushel of unsprayed and one bushel of sprayed Jonathan apples were received from Watervliet, Michigan. These were sent in by Mr. E. W. Scott of the Bureau of Entomology; they were taken from an orchard in which that bureau was conducting spraying experiments. plat from which the sprayed fruit was taken had received the three usual codling-moth applications, arsenate of lead at the rate two pounds to each fifty gallons of water having been used. Upon arrival an examination of this fruit failed to disclose any of the spot disease in either lot. Both lots were covered over in baskets and left in the laboratory at room temperature and reexamined on September 29. At this time characteristic spots averaging 5 mm. in diameter and from 1 to 25 to each apple were found on 9 per cent of the unsprayed and on 18 per cent of the sprayed fruit. On October 23, 65 per cent of the unsprayed fruit was found to be spotted and 66 per cent of the sprayed fruit was similarly affected.

One can only conclude from the results of these experiments that spraying with arsenate of lead is not in any way responsible for the Jonathan fruit-spot. The spots develop on unsprayed fruit as readily as on that which has been thoroughly sprayed with arsenate of lead. It is evident that this poison neither favors nor retards the development of the disease.



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Nearly four hundred cultures of the diseased spots have been made in various ways and on various media, but no organism has been isolated with any degree of consistency. A species of Alternaria often occurred in cultures from fruit grown in the eastern part of the country, but cultures from Northwestern-grown fruit were almost entirely barren. A few apparently successful inoculations were made by spraying Alternaria spores on Jonathans kept in moist chambers and the fungus reisolated, but both the Jon-athan and Esopus (Spitzenberg) are so susceptible to the disease that they are apt to become spotted under any conditions outside of cold storage. In some cases both the inoculated fruit and the controls contracted the disease at about the same time. Spores of this fungus inserted through needle punctures failed to produce the disease. As Alternaria is very commonly associated with the rotting of apples, especially when the fruit is placed in cellar or basement storage, the possibility of its being the cause of this disease becomes very remote.

The fungus Cylindrosporium pomi Brooks occurred in a few of the cultures, but this was probably accidental. It is not unlikely that the Brooks spot and the Jonathan fruit-spot occurred together on some of the apples from which cultures were made, and for this reason the fungus causing the former might easily have found its way into a few of the cultures, particularly since the two spots are somewhat similar in appearance. Cultures from the true Brooks spot produced the fungus readily, while those from the Jonathan fruit-spot were, with few exceptions, barren. Moreover, spraying with a fungicide prevents the former disease, but has no effect upon the latter. It seems evident, therefore, that these two diseases are distinct.

Microscopic examinations of the af-fected tissues failed to reveal the presence of any organism to which the disease could be attributed. The cells involved resemble similarly located cells in cases of "bitter-pit," or "Bald-win spot," in which that disease extends to the surface of the apple. Bitter-pit differs from this disease, however, in that it is essentially a disease of the fleshy portion of the fruit, often reaching to the core without affecting the skin, while the "Jonathan spot" is usually little more than skin deep. The writers consider the disease a physiological one, but as in the case of the bitter-pit, the cause is at present obscure.

The investigations conducted by the writers seem to warrant the following conclusions: (1) The Jonathan fruitspot of the apple is due neither to spraying with arsenate of lead nor to a specific organism; (2) it is probably a physiological trouble, falling in the same category as the bitter-pit or Baldwin spot; (3) early picking, prompt cold storage and immediate consumption of the fruit after removal from storage will largely obviate losses from the disease.

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT



How Some Current Pruning Practices Defeat the Real Object

By V. R. Gardner, Oregon Experiment Station, Corvallis, Oregon

SK the average fruitgrower why he is in the orchard business and he will give you any one of a number of answers, depending upon how he interprets your question. He may tell you he is growing fruit as a side line, as an avocation; it may be that his health dcmands that he do outdoor work; possibly he was brought up on a fruit farm and thus came more or less naturally into the business. However, regardless of how they got started, most fruitgrowers are in the business primarily for what it will yield in the way of financial returns. The orchard may be a means of affording pleasure to the owner, indeed it should be, but it must be a means of affording him a living. We maintain the orchard not primarily for its looks, for the addition it makes to the landscape, but for what it can do. Our primary object is to take from it year after year the largest possible quantities of fruit of the best possible grades and at the lowest practicable costs. It is because of this that we cultivate, fertilize, thin, spray, prune and otherwise care for the trees. This being true, the value of any particular orchard operation or practice can be-and should be-measured by the way in which it influences yield, grades and cost of production.

If, then, we ask the question "why do we prune?" our answer is that fundamentally we prune to get more fruit and better fruit, to increase quantity and quality or to lower its cost per box. At this point it may be objected by some that we also prunc to secure a certain shaped tree. That, however, is a matter of training, and pruning should not be confused with training. Training has to do with the shaping of trees, with making them assume one form or another. We train trees with open or close centers; with round,

spreading or flat tops; with many or few scaffold limbs; with high or low heads. Here it should be emphasized that training does not have to do directly with the functioning, with the beheavior of the tree. This is, of course, far from saying that training is not important. A tree trained with an open center may be much better adapted to a certain soil, a certain slope and a certain amount of humidity than a close-centered tree of the same variety. The reverse may be true of the same variety under an entirely differ-

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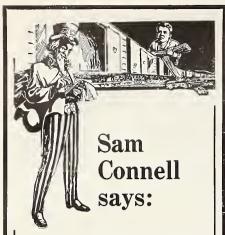
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SAM CONNELL, Manager

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ent set of conditions. But whether in training we secure a good shape or a poor one for a certain variety under our conditions, training has to do primarily with form. On the other hand we prune trees to so modify, to so control their fruit habits that larger and more regular crops of better fruit will be borne. In other words, we prune to modify function.

Broadly speaking, we can control the fruiting habit of fruit trees only in so far as we can control their machinery for fruit production. The flower is usually regarded as the mechanism that the plant constructs for the ultimate purpose of fruit and seed formation, but flower formation depends to a very large extent upon the number of flower spurs or, as we call them, fruit spurs, present and upon their behavior. This is practically the equivalent of saying that the fruit spur is the real machine that the tree builds and through the operation of which its fruit is manufactured. Possibly exception may be taken to this in the case of bearing on one-year-old wood, but this rather extraordinary habit of some varieties (it is understood this discussion pertains only to apples and pears) is not general enough to seriously conflict with the statements made. At any rate the fruit spur is the mechanism that the tree usually employs in its work of fruit bearing. doubt many factors influence the initial development and the later health and vigor and regularity of functioning of fruit spurs. Indeed there are good reasons to believe that most of our orchard practices, such as cultivation, fertilization, spraying, the use of cover crops, etc., influence them either directly or indirectly—perhaps mainly indirectly. Pruning, however, has generally been looked upon as a practice, almost as the practice, through which we directly influence fruit spurs. All fruitgrowers know that they can prune them out and thus reduce their number. Many believe that by this or that pruning practice they can stimulate their formation, or possibly increase their vigor or lengthen or shorten their life, etc.; and these beliefs are founded upon careful observation and experience. To just what extent the existence, the vigor, the health, the length of life and the regularity of bearing of individual fruit spurs are influenced by definite pruning practices, such as heading in, thinning out, summer pinching, etc., is far from being generally understood. In other words, we realize that pruning influences the fruit-spur system of the tree, the fruit-producing machinery of the tree, but we don't realize how it influences it nor to what degree.

At this point it will be well to consider what we really desire in the way of fruit spurs on our trees. Looking at the question from the viewpoint of their fruit spurs, when are our trees in the best condition? Do we want the spurs to be many or few in number? large or small? long lived or short lived? Should we aim to have each bear a fruit every year or every two years, or every four, eight or ten years?

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These may seem superfluous questions, but investigation will show that they are not. The trees in some orchards are full of fruit spurs, those of other orchards are relatively much fewer in number. The individual fruit spur in some orchards average an apple or a pear once every two or three years; those in other orchards average a fruit only once in four or five or six or eight or even ten years. The average length of life of the fruit spur in some trees may be three or four years, in others thirty or forty years. These are extremes, of course, but they represent facts regarding the fruit-manufacturing machinery in our orchards. Surely all of these conditions cannot be equally satisfactory. There must be some of these extremes that are distinctly undesirable. Possibly no extreme is desirable. What are the correct answers to the questions that have been asked? If the fruit-spur system of the tree is its mechanism for fruit production then is it not reasonable that we should prune (1) to obtain as large a number of fruit spurs as possible, for, within certain limits to be mentioned later, the larger the number of fruit-manufacturing machines the larger will be their total output. And is it not also reasonable that we should prune (2) to keep the fruit spurs that we once secure in as thrifty, vigorous and healthy condition as possible, for the better condition a machine is in the better is the product that it will turn out.

Now let us ask what are the pruning practices that stimulate and encourage the formation of the largest possible number of fruit spurs, and what are the pruning methods and practices that either directly or indirectly limit fruit-spur formation. First, it may be mentioned that not a few fruitgrowers deliberately remove fruit spurs from the scaffold limbs of their trees. Of course many orchardists would never permit such pruning in their orchards, but it is far from uncommon. The writer well remembers visiting one orchard of over 5,000 large bearing trees where the new manager was having this done. The idea evidently was that the trees "look better" when they have perfectly smooth limbs, their surface unbroken and unmarred by irregular jagged spurs. Little thought was given to the fact that immediate and future yields were being reduced, that indeed the part of the tree best able to bear heavily was probably being rendered permanently barren. How many people pruning trees between the ages of two and five years prune with their future bearing habit and bearing surfaces in mind? Probably very few. Too many are inclined to think that at that age they are pruning simply to secure vigorous wood growth and proper shape. At that stage of tree growth these questions should be dominant, but that does not mean that future bearing habit should be entirely lost sight of. Especially is this true when pruning trees four, five and six years old. If the branches of young trees are pruned too heavily practically all the buds left are



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forced into growth. This necessitates severe thinning and severe heading back the following year; and these two processes kept up year after year for three or four seasons mean that but very few buds that can develop into fruit spurs will be left in the lower and central part of the tree. It is probably good practice to prune heavily trees that have been set one, two, three, four and occasionally five years. By this heavy pruning wood growth is greatly stimulated and a large, vigorous tree with good strong framework can be quickly grown. But when the time comes for the tree to begin to bear the kind of pruning employed should be entirely changed, for an entirely different type of growth is wanted. The energies of the tree are to be turned into another direction, or at least they are to be divided and part of them expended for fruit spur and fruit production. In terms of pruning practice this object is accomplished mainly by comparatively light pruning for at least a couple of years. Yet many orchards that are or have recently reached bearing age show that the one directing their pruning has figured (if, indeed, he has thought about this particular question at all) that the same type of pruning that has been giving him excellent vegetative growth will in some way also give him fruit spurs, though other conditions have in no way materially changed. In hardly any other way can the frequent heavy pruning of trees between four and eight or ten years of age be explained. It sometimes seems as though we have a kind of blind faith that our trees will somehow come into bearing without much effort on our part and in spite of almost anything we can do to prevent it. Consequently we give little thought to pruning as it really influences bearing habit.

What has just been said regarding the limitation of the number of fruit spurs by severely pruning young trees applies with equal force to the severe pruning of bearing trees. In general heavy pruning greatly reduces the number of buds that can develop into fruit spurs, if it does not actually remove many, and also forces a large percentage of the buds left into vegetative growth. In extreme cases it forces well formed and properly functioning fruit spurs into leafy, non-fruiting shoots. It thus limits the fruit-bearing surface in four distinct ways. This is far from stating that heavy pruning is never desirable; but the fact should be emphasized that heavy pruning greatly reduces the amount of the tree's machinery for fruit production. The question is here raised, are not many orchards forced into wood growth year after year by the heavy pruning that they receive, when a lighter pruning, or in extreme cases no pruning at all, would permit the development of muchneeded fruit spurs? It should be stated here that by "heavy pruning" is meant just what the term implies, whether the removal of top growth consists in the taking out of a few large limbs or of many smaller ones, whether it con-

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sists in the thinning out or the heading back of branches or of both, whether the interior or the exterior of the tree is sacrificed. It may be that few growers prune heavily as a matter of choice. They possibly think they have to to keep their trees in "good shape," regardless of what this kind of pruning does to the fruit spurs. At any rate the fact remains that heavy pruning is an exceedingly common orchard practice.

From what has been said it might be inferred that no pruning at all will give us the largest possible number of fruit spurs, as the largest possible number of buds are left to grow into spurs and so many start that few can develop into purely vegetative shoots. Theoretically at least this is probably more or less true. Practically, however, it is undesirable to stimulate, or more accurately, permit fruit-spur formation to proceed to that extent. This is because we desire not so much the greatest possible number of fruit spurs in the trees as fruit spurs that are healthy, vigorous and in good condition in every way so that they will flower and fruit regularly for many years. The health, vigor and longevity of the fruit spur depend upon its food and moisture supply and upon the amount of sunlight it receives. It is possible for a tree to be so situated that there is not enough moisture and food present to supply properly all the spurs and their developing fruits. It is also possible for the upper and outer limbs to be so numerous and the growth they make so dense that many of the inner and lower branches, with their fruit spurs, receive insufficient light to keep them thrifty. Later these shaded spurs die off and the fruiting area of the tree is thereby reduced. Under these circumstances judicious pruning would so limit the number of spurs that there would be food and moisture for all, and the branches would be so thinned that enough sunlight would filter through the outer and upper part of the tree to keep the remaining parts growing vigorously. Just as too severe pruning reduces the number of fruit spurs, too little pruning weakens them, reduces their vitality, shortens their life and makes them function irregularly. The problem of the fruitgrower then is to maintain the proper balance between the number of fruit spurs and their health and vigor. He does not desire so many that some of them die out; he does not wish for so many that even though all live most of them bear irregularly. On the other hand, he does want as many as the size of the tree and its food and moisture supply can keep alive and healthy and bearing regularly.

The question that we may now raise is, how do current pruning practices maintain the life and strength and vigor of fruit spurs? How do they influence their longevity and the regularity with which they bear fruits? How do they maintain the proper balance between number and strength of fruit spurs? Do they allow too many fruit spurs or do they go too far in reducing their numbers? Do they keep the spurs

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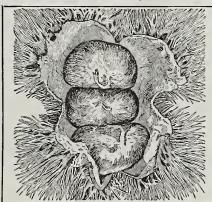
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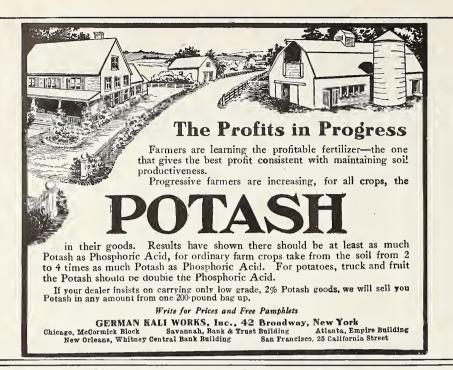
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strong or do they allow many to die? A partial answer has already been given to this question in discussing the subject of heavy pruning. Though possibly a smaller percentage of fruitgrowers under-prune than over-prune, too little pruning is without question the direct cause of small crops and inferior fruit in many orchards. It is not necessary to visit a large number of orchards in order to find evidence of too light pruning. Dead and dying fruit spurs are very common, especially on older trees. There may be loss of fruit spurs from dense shading in overpruned trees and there will, of course, be a certain loss from other perfectly legitimate causes (e. g., occasional injuries incident to picking) in very wellcared-for trees, but in general the dying out of many fruit spurs indicates too little pruning. The fact is that an exact balance between number and vigor of fruit spurs, between fruit and wood production in the trees, cannot be maintained. The best we can do is to maintain an approximate balance. The grower often falls far short of maintaining this approximate balance because he does not realize that there is a balance to maintain or does not appreciate its real nature. This is not because he does not spend enough time pruning. He realizes that it is one of the most important of his orchard operations. He perhaps studies the problem more assiduously than he does any other orchard practice. However, he does not approach the problem from the right angle, view it in the right light. He looks upon pruning as a means of obtaining a tree of a certain form, of a certain type, and bends the best of his energies toward that end. He uses pruning as a means of modifying form when it should really be a means of modifying function. Consequently he trains his trees instead of pruning them. In training them he may incidentally, or accidentally, prune them, and in the best possible manner, but if so it is more or less a matter of coincidence.

Thus far an attempt has been made only to point out the fundamental objects of all true pruning and to present one or two of the principles underlying pruning operations. Incidentally the inevitable results of too much and of too little pruning have been mentioned. It hardly need be added that the unpruned tree is not necesarily the best pruned tree; the much-pruned tree it not necessarily the best pruned tree; neither extreme is apt to give the best results. In fact the contrary is most apt to be the case. The practical question at once arises, "how much are we to prune"? From the very nature of the question, or rather of the subject with which it deals, no answer can be given which can be taken as a rule to be always followed. It is the principles that have been discussed which underly tree growth and fruit production that determine amount of pruning. Only as these principles are applied to each individual problem as it arises-in other words, to each individual tree-can the



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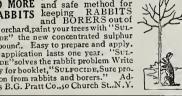
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right amount of pruning be done. From what has been said it is evident that proper pruning consists in the removal of just enough wood to afford the largest possible number of fruit spurs, a good supply of light and food, and consequently keep them growing vigorously and fruiting regularly. tendency on the part of the tree to produce watersprouts and other wood growth at the expense of fruit spurs indicates that too heavy pruning has already been done. Irregular bearing and dying out of fruit spurs indicates that too little pruning or pruning in the wrong part of the tree, or both, have been faults of recent years. Lighter pruning in the first instance and heavier pruning in the second instance are the correctives. The person who prunes should glance quickly over the tree, judge quickly and accurately of the balance (or lack of it) that exists between wood and fruit production, between vegetative growth and fruitbearing surface, and then proceed to restore or maintain this balance. In its last analysis the question of amount of pruning becomes a question of judg-Rules cannot be given, or if ment. given they are almost worse than useless. They mislead as often, or more often, than they lead aright. Principles governing amount can be more or less thoroughly understood and then applied to individual cases. Principles are al-

ways the same.

Pruning is not only a problem of degree, of amount, it is a question of kind as well. That is to say, the fruitgrower not only needs to know the principles underlying the amount of pruning to do, but of equal importance is the question of how that amount shall be done. Having determined upon the right amount of pruning, shall the grower thin out or head back? If he heads back, shall he head many branches a little or shall he head back a few severely? If he thins out, shall he take out a few large limbs or many smaller ones? These questions cannot be considered entirely apart from the question of the number of fruit spurs that we desire, or of their relative strength, or entirely apart from the question of training. Manifestly the thickness and density of growth, which is modified by thinning of one kind or another, bears an important relation to the health and vigor of the fruit spurs, especially those in the lower and central parts of the tree. In general it may be stated that heading in tends to thicken the top, while thinning out, as the term indicates, thins it. Thinning, of course, in addition to reducing the number of actual or potential fruit spurs, lets in sunlight and thus tends further to keep the remaining ones healthy and vigorous. Heading in, on the other hand, while reducing the number of actual and potential fruit spurs much like thinning out, really tends to afford less light to the spurs on the inner and lower limbs, and thus is apt to reduce rather than to increase their vigor and longevity. Though heading in acts as a stimulus to the de1 Bees do surely increase the fruit vield. They make bigger, better fruit, are easily handled and cost nothing to keep. Look into the matter. Write now for full particulars to

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velopment of buds that are left and thus in one way forces lateral growth, thinning also encourages lateral growth through the removal of branches that would otherwise check it. In other words, both practices are a stimulus to fruit-spur formation, heading in being the greater of the two. Of the two, thinning is probably the greater aid in increasing the vigor, longevity and regularity of bearing of individual fruit spurs. Consequently if it is a greater number of fruit spurs that we need, thinning and heading in should be combined. If we have enough or too many fruit spurs and wish mainly to increase their vigor, longevity, and regularity of bearing, thinning is the practice that we should mainly employ. This is again the equivalent of saying that principles, and not rules, should determine the kind of pruning that we should do. Good judgment is as necessary in deciding between heading in and thinning out as in deciding upon

amount of pruning to do.

Though this article does not deal with training, a word is in place regarding the relation of pruning to methods of training. The two subjects are quite independent and this fact should be emphasized. The one has to do with form, the other with function. The grower should not confuse the two. He should realize that there may be much pruning and very little training; and conversely much training and very little pruning. A tree may be well pruncd almost regardless of the way in which it is trained. To be more specific, the open or the close-centered, the high or the low-headed, the round or the flat-topped, the spreading or the pyramidal tree may be well pruned or it may be poorly pruned. It is not the object of this article to minimize the importance of training or to encourage one type of training over another. Good training is desirable; it means much to the fruitgrower. At the start he should study carefully the advantages and disadvantages of the different systems of training and use his best judgment in deciding upon which one is the best adapted to his variety or varieties as they grow naturally under his conditions. When the system of training is once settled let it remain settled, for if the right system has been selected for a certain set of conditions there will be no reason for changing it. The attention of the grower can then be turned to a study of the few simple principles underlying all pruning and to an application of these principles to the problems that his individual trees present.

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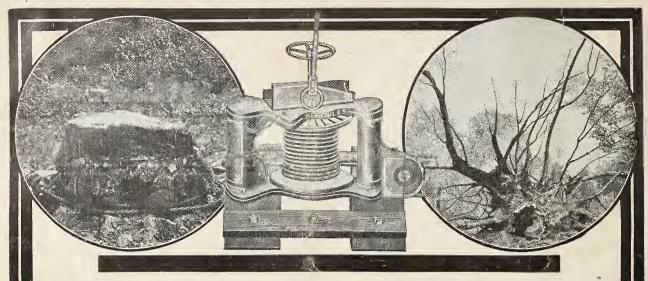
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